

## CHAPTER 6

### MAINTENANCE OF HERCULES MONORAIL LAUNCHER

#### Section I. GENERAL

##### 56. Scope

This chapter contains maintenance information covering the launcher that is within the scope of direct and general support maintenance personnel. The scope of maintenance is determined by the listing of direct and general support maintenance parts in TM 9-1440-250-15P/1/1 and the listing of special tools for direct and general support maintenance personnel in Department of the Army supply catalog (SC) 4935-92-CL-011.

##### 57. References

Organizational maintenance of the launcher is covered in TM 9-1440-250-20/1. Schematic diagrams are furnished in TM 9-1440-250-20/2 and wiring lists in TM 9-1440-250-35/1. General maintenance procedures are given in chapter 4.

##### 58. General Precautions

Before performing any maintenance on the launcher, the electrical and hydraulic precautions in *a* through *c* below must be observed.

###### *a. Electrical Precautions.*

- (1) Set the main power switch on the power distribution box to OFF.
- (2) Shut down the launching section generator.
- (3) Disconnect the cable assemblies from receptacles J6A, J69B, and J69C on the front of the power distribution box.

- (4) Place the launching section generator in operation if power is required for other equipment.

###### *b. Hydraulic Precautions.*

- (1) Do not move the piston rods in removed hydraulic cylinders until all hydraulic fluid has been drained.
- (2) Use only the specific hydraulic fluid required by prevailing local environment. Refer to paragraph 37a for the type of hydraulic fluid to be used in temperate and arctic zones.
- (3) Locknuts on tube tees, elbows, and other hydraulic fittings permit these fittings to be adjusted for an easy connection with the attaching pipe or tube assembly. After installing a hydraulic component having fittings attached with locknuts, rotate the fitting for easiest connection of the pipe or tube assembly and tighten the locknut.
- (4) Hydraulic fluid is flammable. Precautions should be taken to prevent spillage. Fire protection measures should be employed.

*c. Pressurized Pneumatic and Hydraulic Systems.* Whenever a tube or fitting of a pressurized system is to be loosened or removed, make certain to depressurize the system in accordance with paragraph 41.

## Section II. MAINTENANCE OF LAUNCHER BASE ASSEMBLY

### 59. General

This section covers the maintenance of the two shock strut assemblies, two launcher rack assemblies, four safety device assemblies, and four launcher strut caps. The general precautions given in paragraph 58 must be observed whenever any maintenance is performed.

### 60. Shock Strut Assembly

The two shock strut assemblies (6, fig. 65) are attached to the support assembly (7) on the launcher base assembly (8).

#### a. Removal.

- (1) Raise the erecting beam to the up-and-locked position as outlined in paragraph 44.
- (2) Remove the shock strut assembly (6, fig. 65).

#### b. Disassembly.

- (1) Remove the four hexagon nuts, lockwashers, and hexagon-head bolts (1, 2 and 3, fig. 66).
- (2) Remove the base, preformed packing, and metering pin (4, 5 and 6).
- (3) Disassemble the remainder of the shock strut assembly.

#### c. Assembly.

- (1) Install the preformed packing and filler plug (18 and 17, fig. 66) on the piston (7); torque the plug to  $15 \pm 5$  pound-feet and secure with the lockwire (22).
- (2) Install the compression spring and rubber bellows (15 and 16) on the piston.
- (3) Install the preformed packing (14) and a preformed packing (5) on the end (13).
- (4) Install the piston ring, plate, spring tension washer, and retaining ring (12, 11, 10 and 9) on the piston head (8).

- (5) Position the piston on the end; compress the spring, and install the piston on the piston head; torque the piston to  $30 \pm 10$  pound-feet.

*Note.* Make certain the spring and bellows are properly seated on the end.

- (6) Install the piston, fiber gasket (21) and overflow screw (20) on the cylinder (19).
- (7) Install a preformed packing and the metering pin (5 and 6) on the base.
- (8) Position the cylinder properly between the end and the base; torque the metering pin to  $8 \pm 1$  pound-feet.
- (9) Aline the holes in the end with the holes in the base, and assemble the remaining parts of the shock strut assembly.
- (10) Torque the four hexagon-head bolts (3) to 4 pound-feet.

#### d. Inspection and Test.

- (1) Perform a visual inspection of the shock strut assembly (6, fig. 65) for completeness of assembly and for nicks, scratches, or other damage.
- (2) Place the shock strut assembly in the sink of the hydraulic test stand 8523711 (fig. 67).
- (3) Prior to testing, warm up the test stand as outlined in TB 9-9502-11/2.
- (4) Remove the overflow screw (6A) from the side of the cylinder (6B); remove the filler plug (6C) from the top of the shock strut assembly.
- (5) With the shock strut assembly in extended position, fill the cylinder with hydraulic fluid as specified in paragraph 37a, to the bottom of the overflow screw hole.



- (6) Install the overflow screw and coat with yellow sealant MIL-S-22473, grade B.
- (7) Use tube nipple AN815-4 (fig. 67) as an adapter between the shock strut assembly and hose assembly AN6292-4-72 by installing the tube nipple in the filler plug port. Torque the tube nipple to  $15 \pm 5$  pound-feet.
- (8) With the shock strut assembly in the vertical position, connect the hose assembly to the tube nipple and apply  $15 \pm 5$  pound-feet of torque to the coupling nut.
- (9) Connect the other end of the hose assembly to one port of bleed valve assembly 8169439.
- (10) Using hose assembly 8169536, connect the other port of the bleed valve assembly to coupling half 8168948.
- (11) Connect the coupling half to PRESSURE of the MOTOR PUMP SYSTEM on the test stand.
- (12) Position the controls and perform the leakage test as prescribed in table X.
- (13) Open the bleed valve assembly and allow the fluid in the hose to drain into the sink of the test stand.
- (14) Install the filler plug and apply  $15 \pm 5$  pound-feet of torque. Secure it with the lockwire (22, fig. 66).

*e. Installation.*

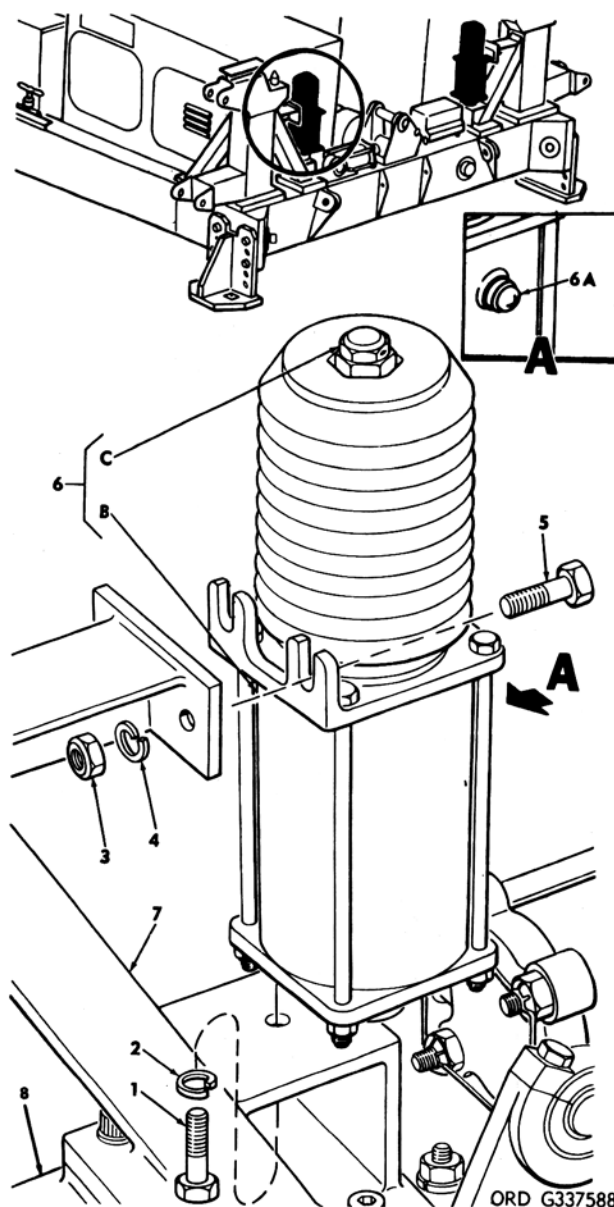
- (1) Install the shock strut assembly on the launcher base assembly (8, fig. 65).
- (2) Lower the erecting beam to the down-and-locked position as outlined in paragraph 44.

## 61. Launcher Rack Assembly and Safety Device Assembly

The two launcher rack assemblies (fig. 68) are located on each side of the launcher base assembly. Two safety device assemblies supporting the rack feet are installed on the trunnion extensions.

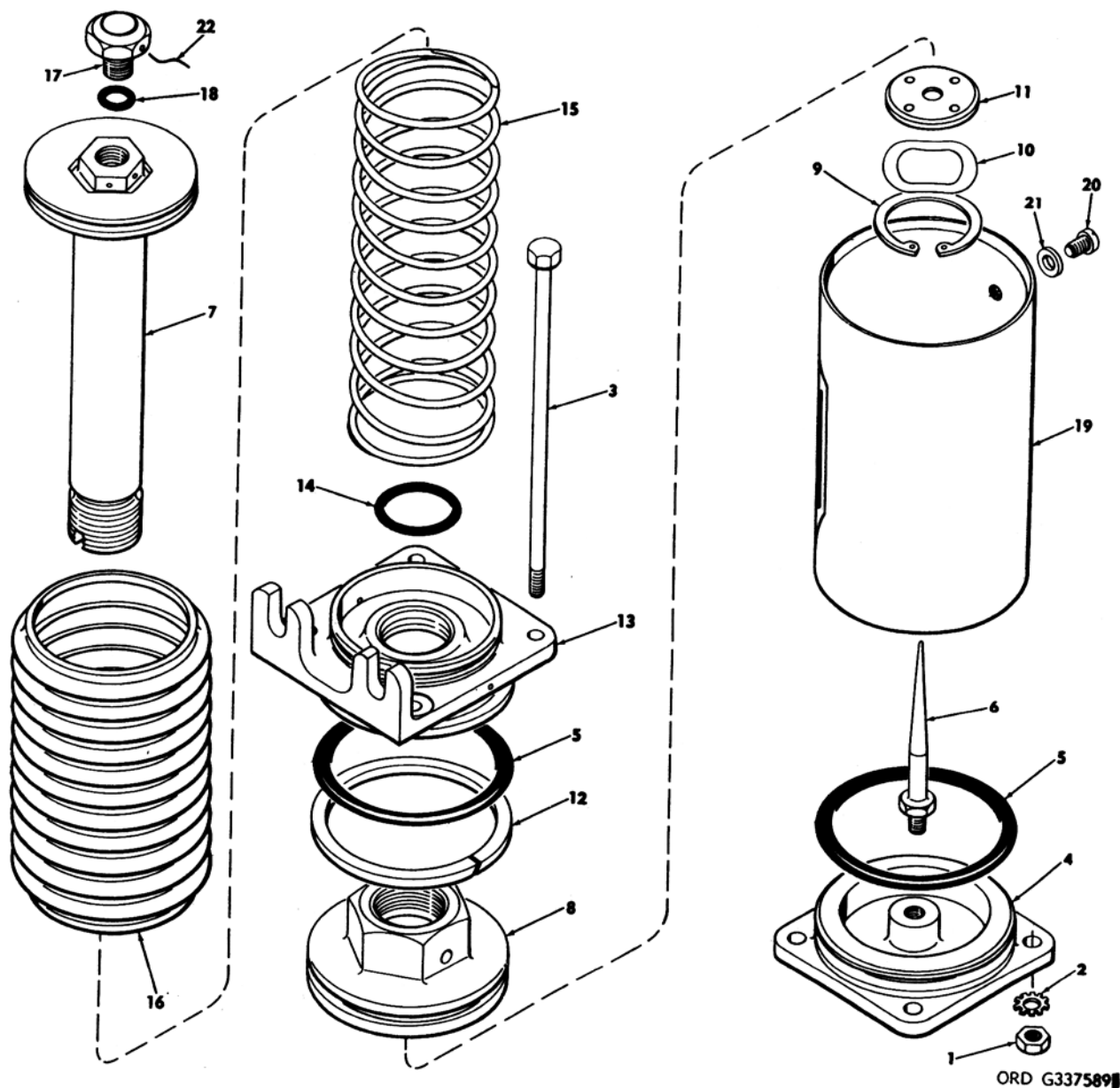
*a. Removal.*

- (1) Remove the outside sleeve bearing.



- 1— $\frac{5}{16}$ -18 x  $\frac{7}{8}$  hex-hd bolt
- 2— $\frac{5}{16}$ -in-id lk washer
- 3— $\frac{3}{8}$ -16 hex. nut (2)
- 4— $\frac{3}{8}$ -in-id lk washer (2)
- 5— $\frac{3}{8}$ -16 hex-hd cap screw (2)
- 6—Shock strut assy
- A—Overflow screw
- B—Cylinder
- C—Filler plug
- 7—Support assy
- 8—Launcher base assy

Figure 65. Shock strut assembly—removal and installation—typical.



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- 1- $\frac{1}{4}$ -28 hex. nut (4)
- 2- $\frac{1}{4}$ -in-id ext-tooth lk washer (4)
- 3- $\frac{1}{4}$ -28 x  $6\frac{3}{32}$  hex-hd bolt (4)
- 4-Base
- 5-2.550 id x 0.103 thk preformed packing
- 6-Metering pin
- 7-Piston
- 8-Piston head
- 9-1.500 od x 0.050 thk int retaining ring
- 10-Spring tension washer
- 11-Plate

- 12-Piston ring
- 13-End
- 14-0.864 id x 0.070 thk preformed packing
- 15-Compression spring
- 16-Rubber bellows
- 17-Filler plug
- 18-0.351 id x 0.072 thk preformed packing
- 19-Cylinder
- 20- $\frac{1}{4}$ -28 x  $\frac{5}{16}$  cross-recessed pan-hd overflow screw
- 21- $\frac{1}{4}$ -in-id fiber gasket
- 22-Lock wire (bulk issue)

Figure 66. Shock strut assembly—disassembly and assembly.

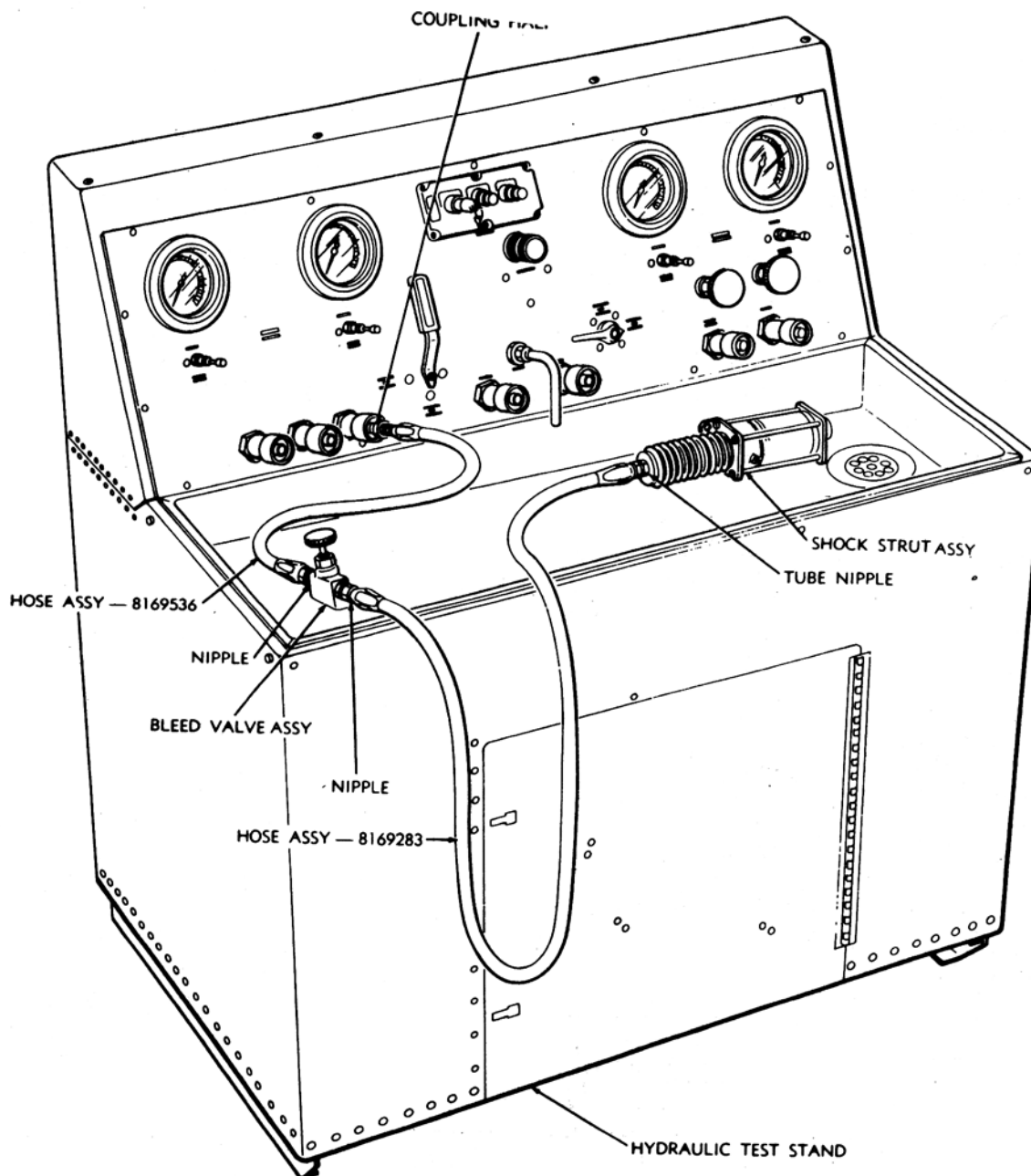


Figure 67. Shock strut assembly—leakage test.

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- (2) Slide rack ram from off the inside sleeve bearing, and remove rack assembly.
- (3) Remove the inside sleeve bearing.
- (4) Remove safety device assembly.

*b. Installation.*

- (1) Assemble each roller assembly between two safety-device spacers; insert sleeve bearing; and position on trunnion extension.

- (2) Position the safety device assembly on the sleeve bearing, and secure it and the stop with a 5/8—18 x 2 7/8 hexagon-head bolt, a 5/8—18 slotted hexagon nut, and a 9/64 x 1 1/2 cotter pin.

*Note.* If the stop is not present, fabricate it in accordance with figure 68.1.

*Note.* The stop will be applied to the four safety devices on each launcher, replacing washer AN960-C1016

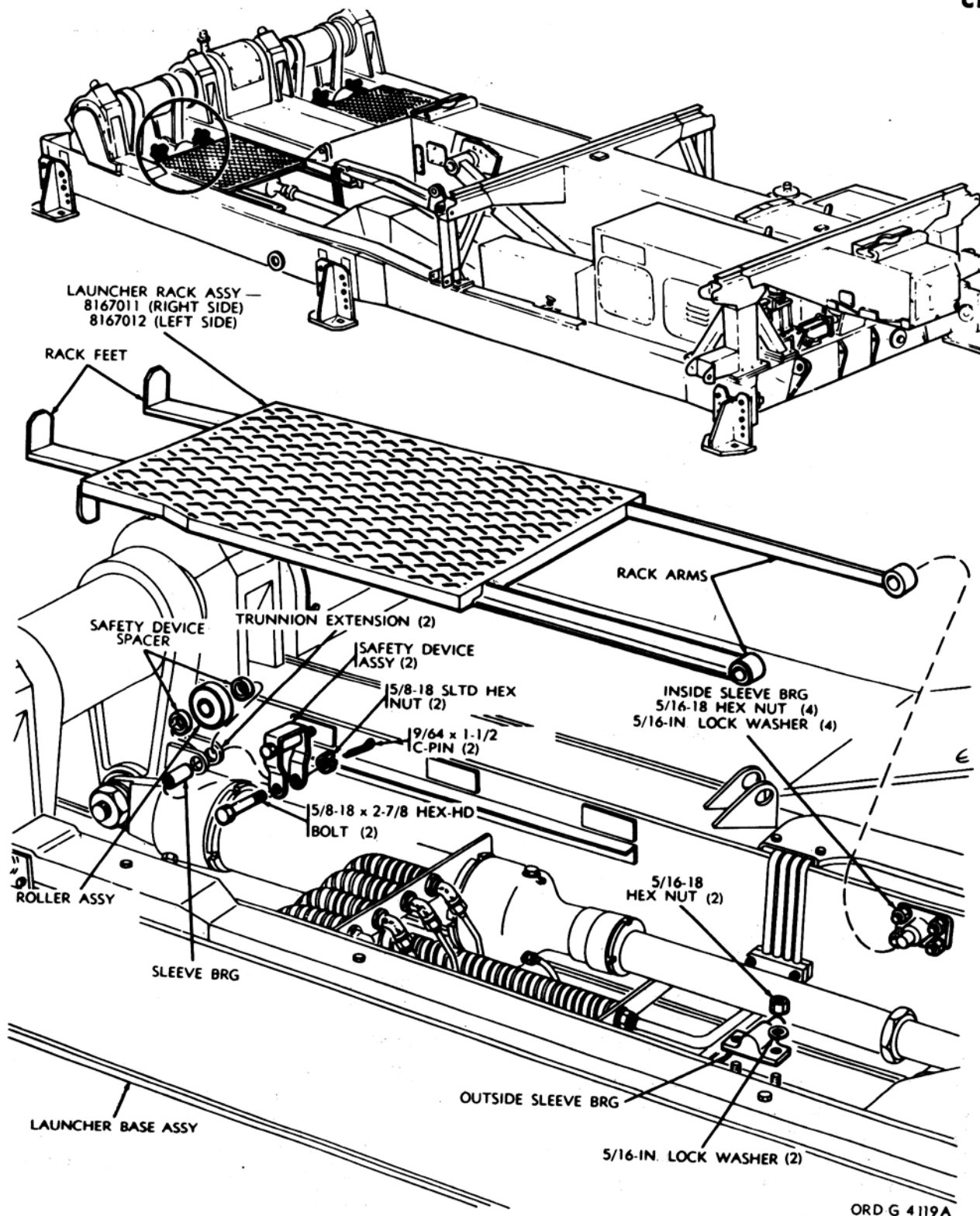


Figure 68. Launcher rack assembly and safety device assembly—  
removal and installation—typical.

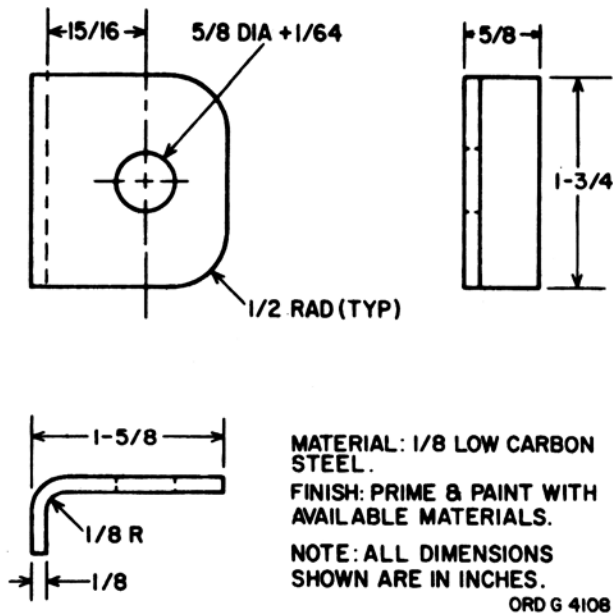


Figure 68.1. Fabrication of stop.

- (3) With both safety device assemblies installed, install the rack feet through the safety device assemblies.
- (4) Install the inside sleeve bearing with four 5/16-inch lockwashers and 5/16—18 hexagon nuts.
- (5) Slide the rack arm on the inside sleeve bearing.
- (6) Insert the outside sleeve bearing in the other rack arm, and attach the outside sleeve bearing and the rack assembly with two 5/16-inch lockwashers and 5/16—18 hexagon nuts.

## 62. Launcher Strut Cap

Four launcher strut caps (fig. 69) are installed on the launcher base assembly to cover each end of the two strut pins. The strut caps provide for lubrication of the pins through lubrication fittings.

a. *Removal.* Remove the strut cap and lubrication fitting.

b. *Installation.* Install the launcher strut cap and lubrication fitting.

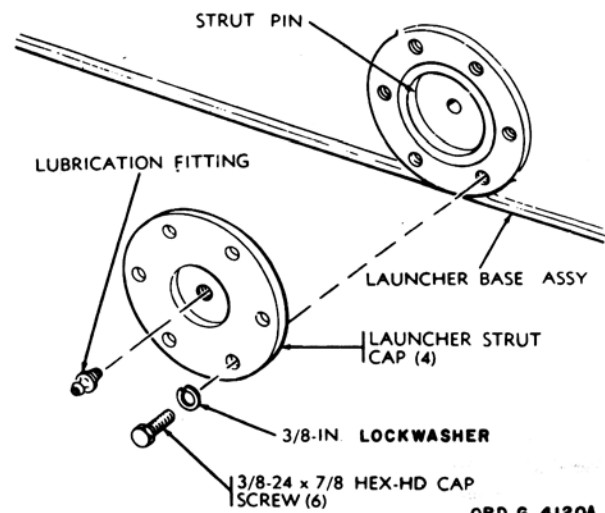
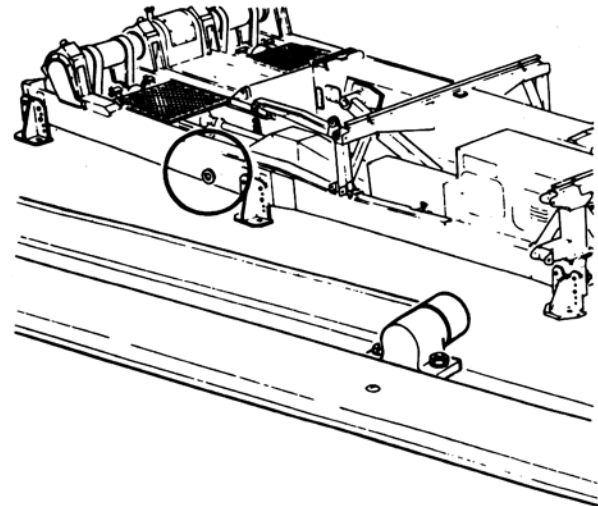


Figure 69. Launcher strut cap—removal and installation—typical.

Table 10. Shocks Strut Assembly Leakage Test within Hydraulic Test Stand—8523711

Control	Position	Reading/Indication
1. GAGE A SHUT-OFF 2. GAGE B SHUT-OFF 3. PRESSURE TO MANIFOLD— MANIFOLD TO RESERVOIR 4. RELIEF VALVE 5. PUMP MOTOR 6. RELIEF VALVE 7. RELIEF VALVE 8. PRESSURE TO MANIFOLD— MANIFOLD TO RESERVOIR 9. GAGE B SHUT-OFF 10. PUMP MOTOR + 11. GAGE A SHUT-OFF 12. PRESSURE TO MANIFOLD— MANIFOLD TO RESERVOIR 13. RELIEF VALVE 14. PUMP MOTOR 15. RELIEF VALVE 16. RELIEF VALVE	Close Open PRESSURE TO MANIFOLD  Open Depress START pushbutton Adjust slowly Open MANIFOLD TO RESERVOIR Close Depress STOP pushbutton Open PRESSURE TO MANIFOLD  Open Depress START pushbutton Adjust slowly Open	To read 800 ( $\pm 50$ ) psi on GAGE B and hold for 20 seconds. Leakage is permitted only around overflow screw. If leakage occurs elsewhere, disassemble shock strut and replace defective component.
17. PRESSURE TO MANIFOLD— MANIFOLD TO RESERVOIR 18. PUMP MOTOR 19. GAGE A SHUT-OFF	MANIFOLD TO RESERVOIR Depress STOP Pushbutton Close	To read 25 psi on GAGE A and hold for 10 minutes. Leakage rate not greater than two drops in 12 hours. If undue leakage persists, disassemble shock strut and replace defective component.

### Section III. MAINTENANCE OF LAUNCHER ELECTRICAL SYSTEM

#### 63. General

This section describes the removal and installation of the components of the launcher electrical system allocated for direct and general support maintenance. The components of the system are divided into four general groups, referred to as the power distribution box, the launcher base electrical components, the launcher erecting beam electrical components, and the hydraulic pumping unit electrical components. The elec-

trical precautions described in paragraph 58a must be observed whenever any electrical system maintenance is performed.

#### 64. Power Distribution Box

The power distribution box (fig. 2) is installed on all HERCULES monorail launchers.

*Note.* The key numbers shown in parentheses in *a* and *b* below refer to figure 70.

**a. Access Door Assembly.**

(1) **Removal.** Release the stud assemblies (6), remove the pin (2) from the door assembly (3) and remove the door assembly.

(2) **Disassembly.**

(a) Remove the split washers (5) and the stud assemblies.

(b) Remove the gasket (7).

(3) **Assembly.**

(a) Install the gasket on the plate (4) as described in paragraph 36b.

(b) Install the stud assemblies and the split washers on the plate using sealant 8030-275-8110 as described described in TM 9-1400-250-15/3.

(4) **Installation.**

(a) Position the door assembly on the power distribution box (1) and install the pin.

(b) Peen the ends of the pin and close the door assembly.

**b. Cover Assembly.**

(1) **Removal.**

(a) Remove the 14 screws (8) from the cover assembly (9).

(b) Disconnect the relay rack wiring harness assembly (10).

(c) Remove the cover assembly.

(2) **Disassembly.**

(a) Remove the five nuts (11), the lock-washers (12), and the screws (13) from the cover angle (14).

(b) Remove the relay rack assembly (15).

(c) Remove the rubber-cork gasket from the cover plate (17).

(3) **Assembly.**

(a) Install the rubber-cork gasket on the cover plate as described in paragraph 36b.

(b) Install the relay rack assembly on the cover angle.

(4) **Installation.**

(a) Connect the wiring harness assembly to the relay rack assembly and position the cover assembly on the power distribution box.

(b) Install the cover assembly.

**c. Installation of the Optional Heater Coils.**  
Authorized only where intermittent cutoff of

the launcher hydraulic motor is experienced due to high ambient temperature.

**Warning:** Voltages dangerous to life exist in the launcher power distribution box. Set the MAIN POWER BKR to the off position and disconnect all power cables.

(1) Open the power distribution box and remove panel 9018567.

(2) Remove the three coils 9018584.

(3) Install three heavy duty coils 842-8248.

**Note.** Retain the three heater coils removed above to be reinstalled for operation of the launcher in sustained temperatures below 70°F.

**d. (Deleted)**

Figure 71. (Deleted)

Figure 72. (Deleted)

**e. (Deleted)**

**f. Terminal Board Group.**

(1) **Removal.**

(a) Remove the cover assembly (9, fig. 70) as described in b(1) above.

(b) Disconnect the cable assemblies and wiring harness assemblies (figs. 73, 75, and 76) attached to the terminal board group (fig. 73).

(c) Remove the terminal board group.

(2) **Disassembly.** Disassemble the terminal board group as required.

(3) **Assembly.** Assemble the terminal board group.

(4) **Installation.**

(a) Position and install the terminal board group.

(b) Install the clamp around the wiring harness assembly (fig. 73).

(c) Refer to TM 9-1440-250-35/1 and make the proper wiring connections to the terminal board group.

(d) Install the cover assembly as described in b(4) above.

**g. Hydraulic Pumping Unit Power Wiring Harnesses.**

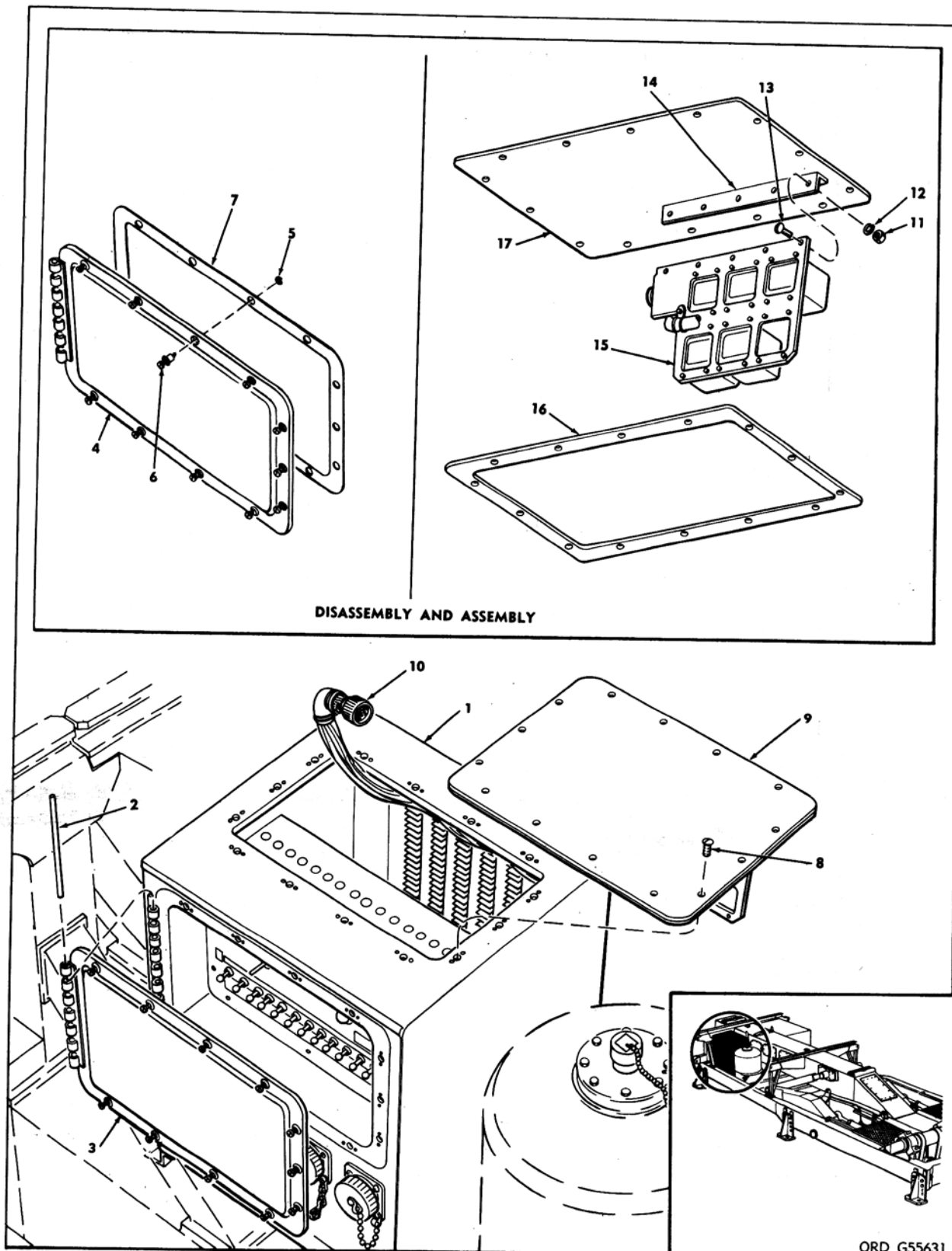
(1) **Removal.**

(a) Remove the cover assembly (9, fig. 70) as described in b(1) above.

(b) Remove the wiring harness assembly (1 or 2, fig. 74).

(2) **Installation.**

(a) Apply class B sealant EC1608 (9020050) or equivalent between



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Figure 70. Power distribution box access door assembly, cover assembly, and relay rack wiring harness assembly—removal and installation.



connector assembly and wall of distribution box (5, 6, fig. 74) as described in TM 9-1400-250-15/3.

- (b) Install wiring harness assembly (1 or 2, figure 74).
- (c) Refer to TM 9-1440-250-35/1 and make proper wiring connections.
- (d) Install cover assembly (9, fig. 70) as described in b(4) above.

*h. Internal Cable Assemblies.* Receptacles of 11 internal cable assemblies and wiring harness assemblies are located on the front, left, and rear of the power distribution box assembly (figs. 73 and 75). These receptacles are externally secured by either of two ways: with four screws attaching the cable assembly to panel of distribution box assembly, or with a single nut retaining the cable assembly from the outside. Another wiring harness assembly (fig. 77) connects to a receptacle on the back of the circuit breaker panel assembly on distribution box assemblies of launcher units 1250 and subsequent. Removal and installation procedures for both of these types of receptacles and their cable assemblies are described in (1) and (2) below.

(1) *Removal.*

- (a) Remove cover assembly (9, fig. 70) as described in b(1) above.
- (b) Remove or disconnect cover or cover assembly on receptacle of cable assembly (figs. 75, 76, and 77) or wiring harness assembly requiring maintenance.
- (c) Remove mounting hardware as required to disconnect cable assembly or wiring harness assembly from panel of distribution box.

*Note.* Refer to figure 77 when removing cable assemblies through clamps on bracket.

- (d) Remove cable assembly or wiring harness assembly (figs. 75, 76, and 77) requiring maintenance.

(2) *Installation.*

- (a) Position cable assembly or wiring harness assembly (figs. 75, 76, and 77) through its appropriate mounting hole.
- (a.1) Apply class B sealant—EC1608 (9020050) or equivalent between receptacle of cable assembly and wall of power distribution box, as prescribed in TM 9-1400-250-15/3, for wiring harnesses or cable assemblies (9, 12, 21 and 22, fig. 75; 7, 8, 11, and 12, fig. 76).
- (b) Install receptacle of cable assembly or wiring harness assembly with mounting hardware.
- (c) Install clamp (4 or 5, fig. 77).
- (d) Refer to TM 9-1440-250-35/1 and make proper wiring connections.
- (e) Install cover assembly (9, fig. 70) as described in b(4) above.

*h.1. Shutoff Cock.*

(1) *Removal.*

- (a) Remove cover assembly (9, fig. 70) as described in b(1) above.
- (b) Remove shutoff cock (24, fig. 75).

(2) *Installation.*

- (a) Install shutoff cock (24, fig. 75).
- (b) Install cover assembly (9, fig. 70) as described in b(4) above.

*i. (Deleted)*

*Note.* The key numbers in parentheses in *j* below refer to figure 78 unless otherwise indicated.

- 1—Power distribution box
- 2—0.089 x 8 1/2 headless straight pin (part of access door assembly)
- 3—Access door assembly
- 4—Plate
- 5—0.156-inch-id split washer (11)
- 6—Stud assembly (11)
- 7—Rubber gasket
- 8—No. 10-32 x 5/8 button-head screw (14)

- 9—Cover assembly
- 10—Relay rack wiring harness assembly
- 11—1/4-20 hexagon nut (5)
- 12—1/4-inch lockwasher (5)
- 13—1/4-20 x 1/2 round-head screw (5)
- 14—Cover angle
- 15—Relay rack assembly
- 16—Rubber-cork gasket
- 17—Cover plate

*Figure 70. Power distribution box access door assembly, cover assembly, and relay rack wiring harness assembly—removal and installation—legend.*

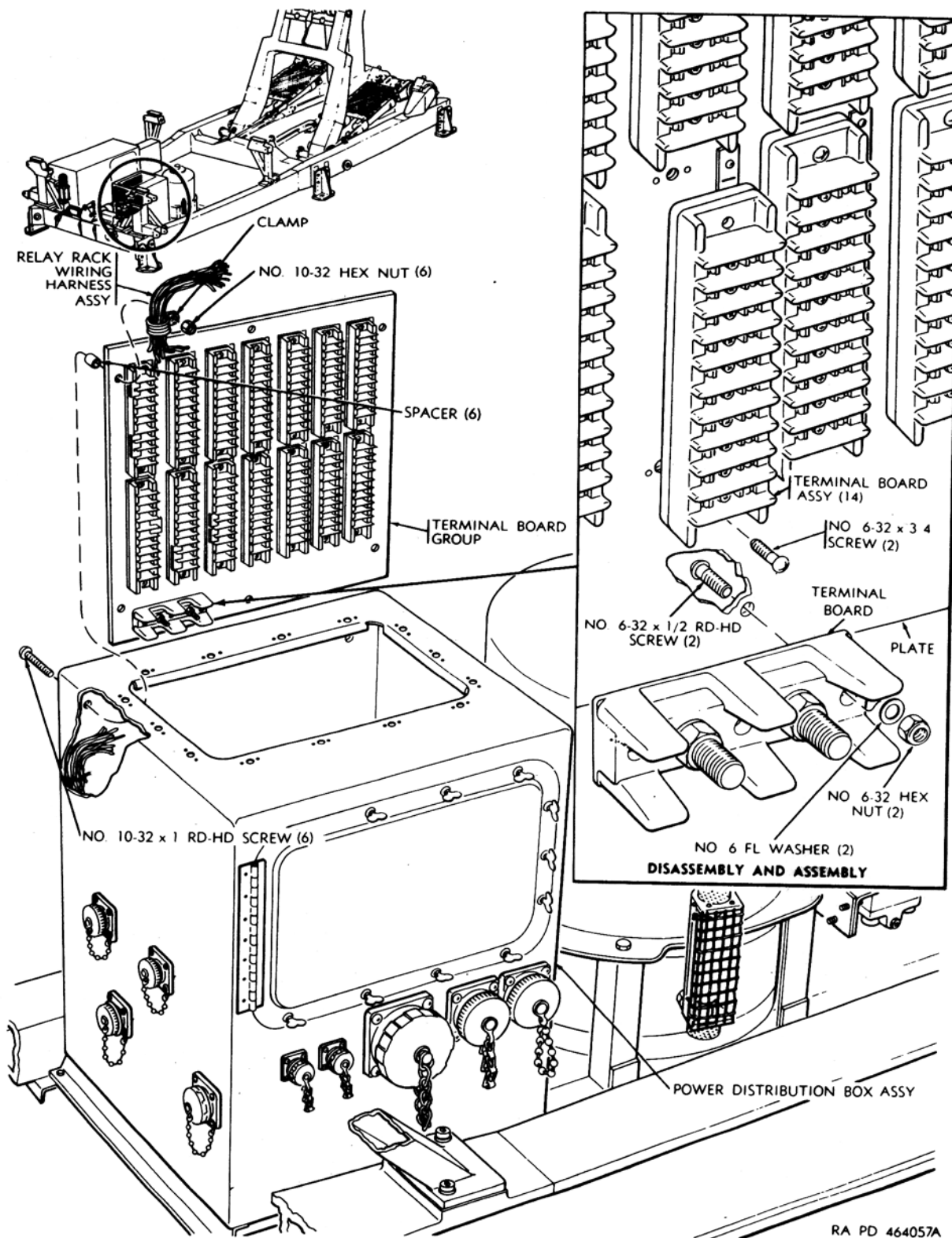


Figure 78. Terminal board group—removal and installation.

**j. Erecting Beam Power Cable Assembly.****(1) Removal.**

- (a) Check that wiring harnesses (1 and 2, fig. 74) are disconnected from receptacle connectors (3, fig. 74).
- (b) Check that erecting beam power cable assembly (9) is disconnected.
- (c) Remove power distribution box (3).
- (d) Remove cover assembly as described in b (1) above.
- (e) Remove adapter assembly (4) and conduit outlet cover (8).
- (f) Remove erecting beam power cable assembly (9).

**(2) Installation.**

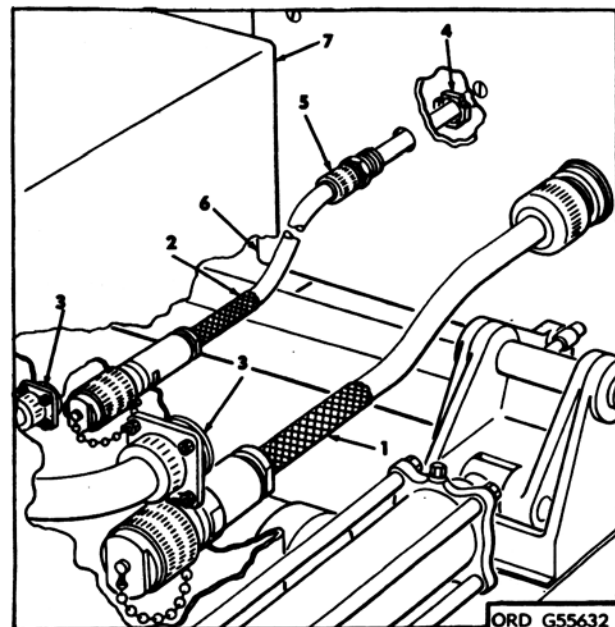
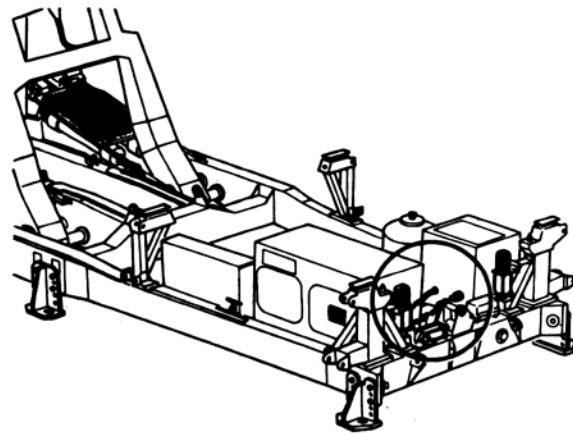
- (a) Position adapter assembly (4) and conduit outlet cover (8) on erecting beam power cable assembly (9).
- (b) Position erecting beam power cable assembly (9) electrical leads in power distribution box (3).
- (c) Apply class B sealant—EC1608 (9020050) or equivalent to attaching surface of conduit outlet cover (8) and power distribution box (3) as prescribed in TM 9-1400-250-15/8.
- (d) Install conduit outlet cover (8).
- (e) Refer to TM 9-1440-250-35/1 and connect wire leads of erecting beam power cable assembly (9).
- (f) Install adapter assembly (4).
- (g) Install cover assembly as described in b(4) above.
- (h) Install power distribution box (3).

**k. Relay Rack Wiring Harness Assembly.****(1) Removal.**

- (a) Remove cover assembly (9, fig. 70) as described in b(1) above.
- (b) Remove wiring harness assembly (fig. 73).
- (c) Remove wiring harness assembly from cover assembly (9, 10, fig. 70).

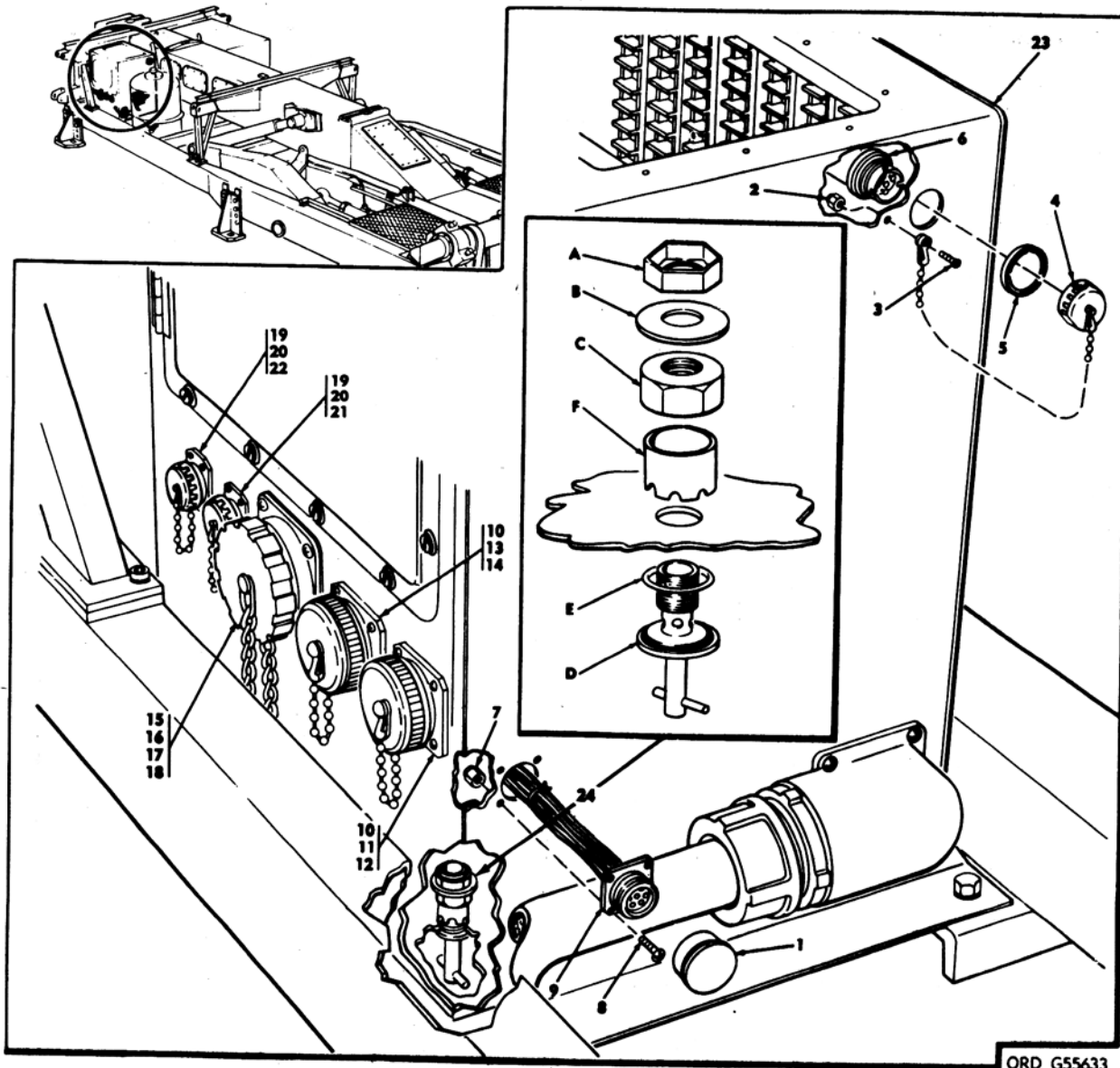
**(2) Installation.**

- (a) Refer to TM 9-1440-250-35/1 and make proper wiring connections to terminal board group (fig. 73).
- (b) Install relay rack wiring harness assembly in clamp (fig. 73).
- (c) Install cover assembly (9, fig. 70) as described in b(4) above.



- 1—Wiring harness assembly—9032761
- 2—Wiring harness assembly—8167542
- 3—Receptacle connector
- 4—1/2-14 locknut
- 5—Connector assembly
- 6—Power distribution box
- 7—Hydraulic pumping unit

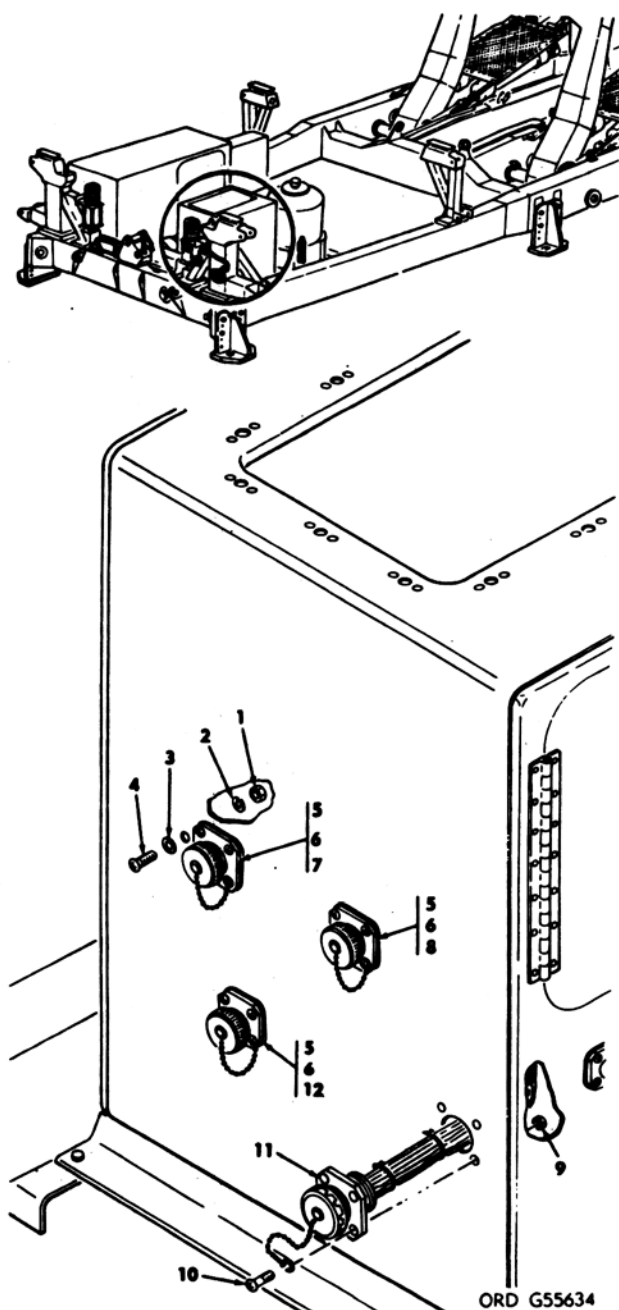
Figure 74. Hydraulic pumping unit power wiring harness assemblies—removal and installation.



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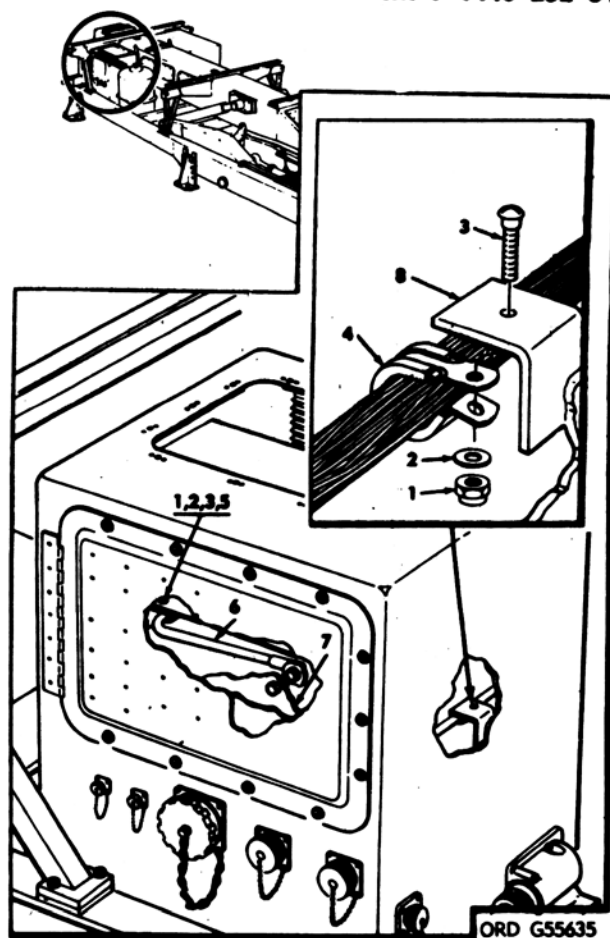
- |  |                                     |
|--|-------------------------------------|
| 1—Cap                                  | 16—1/4-28 x 5/8 roundhead screw     |
| 2—No. 6-32 hexagon nut                 | 17—1/4-28 x 3/4 roundhead screw (3) |
| 3—No. 6-32 x 5/16 round head screw     | 18—Cable assembly                   |
| 4—Cover assembly                       | 19—No. 6-32 hexagon nut (4)         |
| 5—Locknut                              | 20—No. 6-32 5/8 roundhead screw (4) |
| 6—Cable assembly 8167828               | 21—Wiring harness assembly 8167552  |
| 7—No. 8-32 hexagon nut (4)             | 22—Wiring harness assembly 8167551  |
| 8—No. 8-32 x 5/8 roundhead screw (4)   | 23—Power distribution box assembly  |
| 9—Wiring harness assembly              | 24—Shutoff cock                     |
| 10—No. 10-32 hexagon nut (4)           | A—Locknut                           |
| 11—No. 10-32 x 5/8 roundhead screw (4) | B—Washer                            |
| 12—Cable assembly 8167545              | C—Hexagon nut                       |
| 13—No. 10-32 x 3/4 roundhead screw (4) | D—Body                              |
| 14—Wiring harness assembly 9032850     | E—Preformed packing                 |
| 15—1/4-28 hexagon nut (4)              | F—Spider                            |

Figure 75. Internal cable assemblies, wiring harness assemblies, and shutoff cock—removal and installation.



- 1—No. 8-32 hexagon nut
- 2—No. 8 lockwasher
- 3—0.174-inch-id flat washer
- 4—No. 8-32 x 9/16 truss-head screw
- 5—No. 8-32 hexagon nut (4)
- 6—No. 8-32 x 5/8 roundhead screw
- 7—Wiring harness assembly 8167549
- 8—Wiring harness 9032760
- 9—No. 4-40 hexagon nut (4)
- 10—No. 4-40 x 5/8 roundhead screw (4)
- 11—Wiring harness 8167550
- 12—Cable assembly 8167548.

Figure 76. Internal cable assemblies and wiring harness assemblies—removal and installation.



- 1—No. 10-32 hexagon nut
- 2—7/32-inch flat washer
- 3—No. 10-32 x 3/4 roundhead screw
- 4—Clamp MS21919H16
- 5—Clamp MS21919H20
- 6—Wiring harness assembly 9032775
- 7—Circuit breaker panel assembly
- 8—Bracket

Figure 77. Internal cable assemblies and wiring harness assemblies—removal and installation—continued.

## 65. Launcher Base Electrical Components

The launcher base electrical components (fig. 79) are the launcher-base cable assembly, down-lock cable assembly, up-lock cable assembly, up-lock limit switch group, and the telephone-jack extension cable assembly. An up-lock limit switch mechanical linkage (fig. 89) is located on each side of the limit switch group.

*Note.* The key numbers shown in parentheses in a below refer to figure 80 unless otherwise indicated.

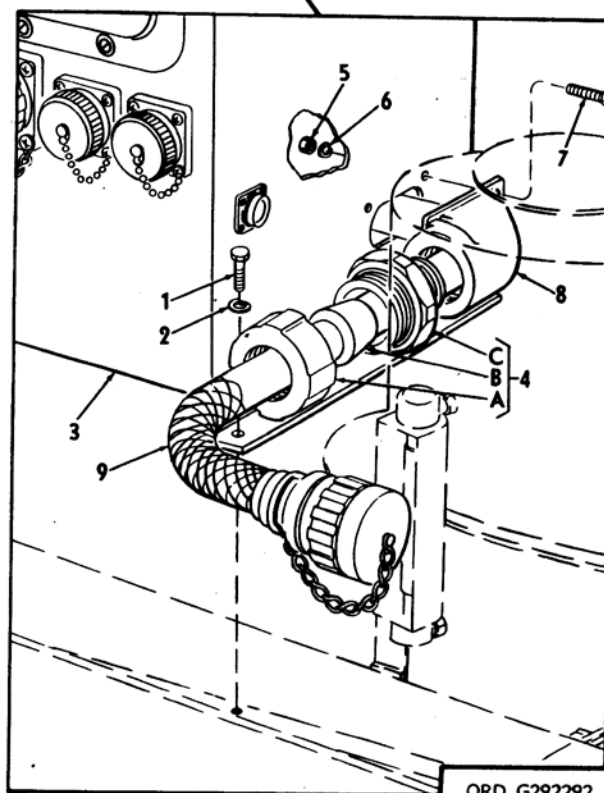
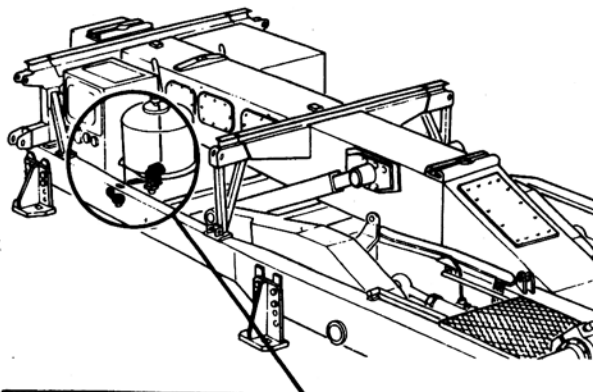
*a. Launcher-Base Cable Assembly.* Removal and installation of the launcher-base cable assembly (5) also provides for maintenance of box connector assembly (4) in the knee of the launcher erecting-beam assembly (27) and the adapter assembly (15) which routes the cable assembly from the launcher base assembly (24) into the beam assembly.

### (1) Removal.

- (a) Install the erecting-beam support as described in paragraph 36d.
- (b) Remove the shield (fig. 82) from the left end of the trunnion.

**Caution:** To prevent damage to the auxiliary jack in mobile installations, loosen the strap that secures the jack to the launcher base, and shift the position of the jack before performing step (c) below.

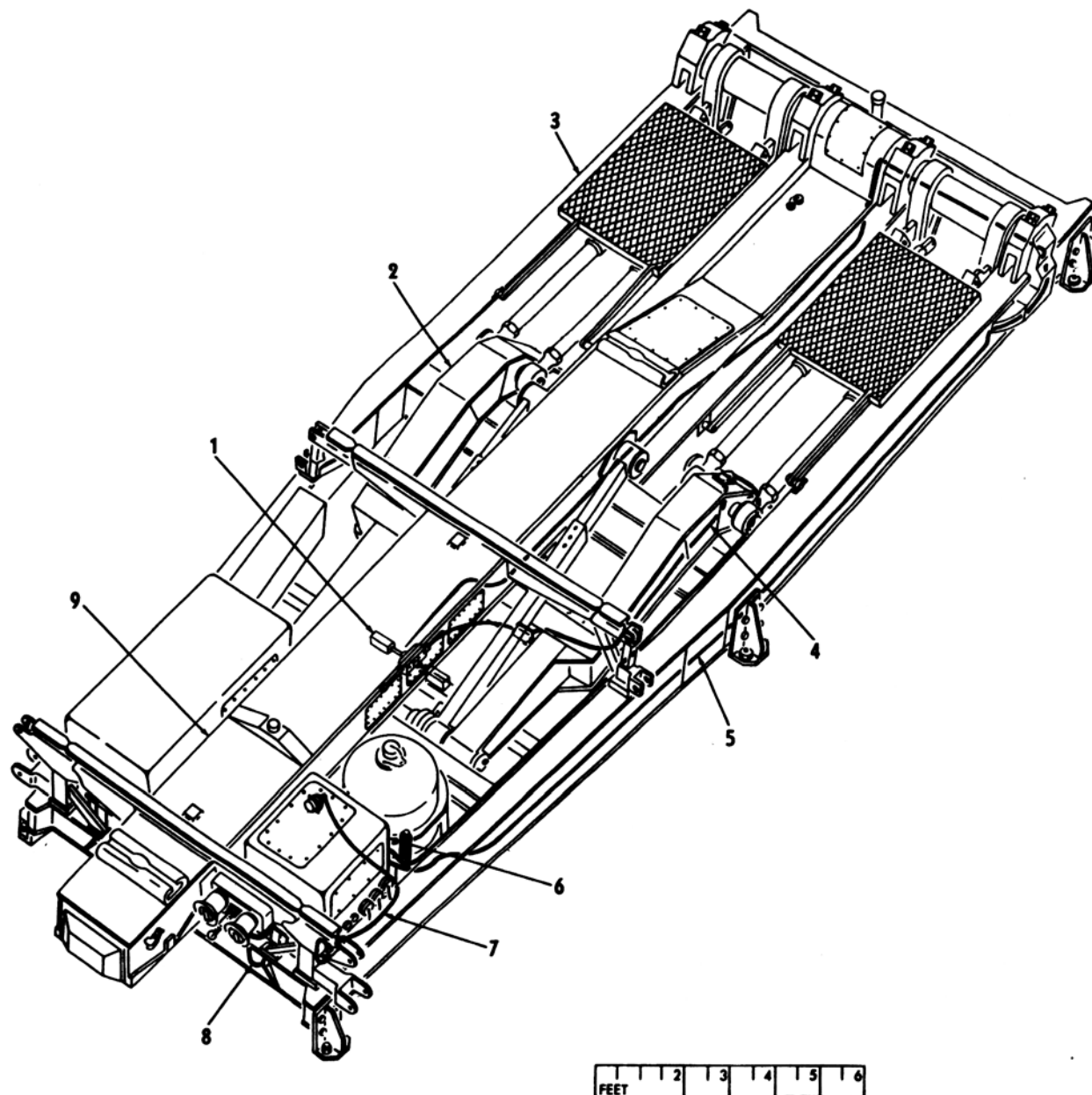
- (c) Remove the erecting-beam trunnion dust cover (fig. 82).
- (d) Remove the beam center cover (fig. 82).
- (e) Remove the three gasket cover assemblies (fig. 83).
- (f) Disconnect the cable assembly from the terminal board assembly (fig. 90).



ORD G292292

- 1—7/16-14 x 1 3/8 hex-hd screw (4)
- 2—7/16-in. lockwasher (4)
- 3—Power distribution box
- 4—Adapter assembly 8528516
  - A—Packing nut
  - B—Bushing
  - C—Body
- 5—No. 12-24 hex. nut (4)
- 6—No. 12 lockwasher (4)
- 7—No. 12-24 x 3/4 rd-hd screw (4)
- 8—Conduit outlet cover
- 9—Erecting-beam power cable assembly 9022387

Figure 78. Erecting-beam power cable assembly—removal and installation.



ORD G292622

- 1—Up-lock limit switch group
- 2—Launcher strut (2)
- 3—Launcher base
- 4—Up-lock cable assembly
- 5—Launcher-base cable assembly

- 6—Power distribution box
- 7—Telephone-jack extension cable assembly
- 8—Down-lock cable assembly
- 9—Launcher erecting beam

Figure 79. Launcher-base electrical components—location.





- (g) Remove the clamp (2) on the terminal board assembly (3).
- (h) Attach a 6-foot pullthrough line to the terminal end, without the connector (fig. 84), of the cable assembly as described in 1 through 4 below.
  1. Tape one end of the line to the cable assembly approximately 18 inches back from the first wire of the cable assembly break-out point.
 

*Note.* This short pullthrough line will be used as an end to which additional pullthrough lines will be attached as each line is to be installed. This accommodation prevents repeated taping of the lines on the end of the cable assembly each time the line is installed.
  2. Tie the line in half-hitches around the cable assembly three or four times, spacing the half-hitches approximately three inches apart.
  3. Tape the line to the cable assembly after the last half-hitch.
  4. Tape all terminals to the line so as to form a long taper.
- (i) Tie a 14-foot pullthrough line (fig. 85) to the free end of the line attached to the cable assembly and tape the knot to form tapers.
- (j) Tie the free end of the pullthrough line to any convenient part of the launcher erecting beam to prevent accidental pullthrough.

- (k) Loosen the packing nut (4A) and pull the cable assembly (5) through the box connector assembly (4), through the center conduit (fig. 85), and out through the beam center cover hole.
  - (k.1) *(Deleted)*
- (l) Separate the 14-foot pullthrough line and the cable assembly line, leaving the pullthrough line in the erecting beam.
- (m) Tie a 10-foot pullthrough line to the cable assembly line and tape the knot as before, securing the free end of the line to prevent accidental pullthrough.
- (n) Pull the cable assembly through the rear conduit and out through the trunnion dust cover hole.
- (o) Separate the pullthrough line and the cable assembly line, leaving the pullthrough line in the erecting beam.
- (p) Tie a 6-foot pullthrough line to the cable assembly line, securing the free end and taping the knot as before.
- (q) Remove the clamp (11) securing the cable assembly (5) to the left end of the trunnion (12).
- (r) Remove the lockwire (13) securing the insulation tape (14) to the cable assembly adjacent to the

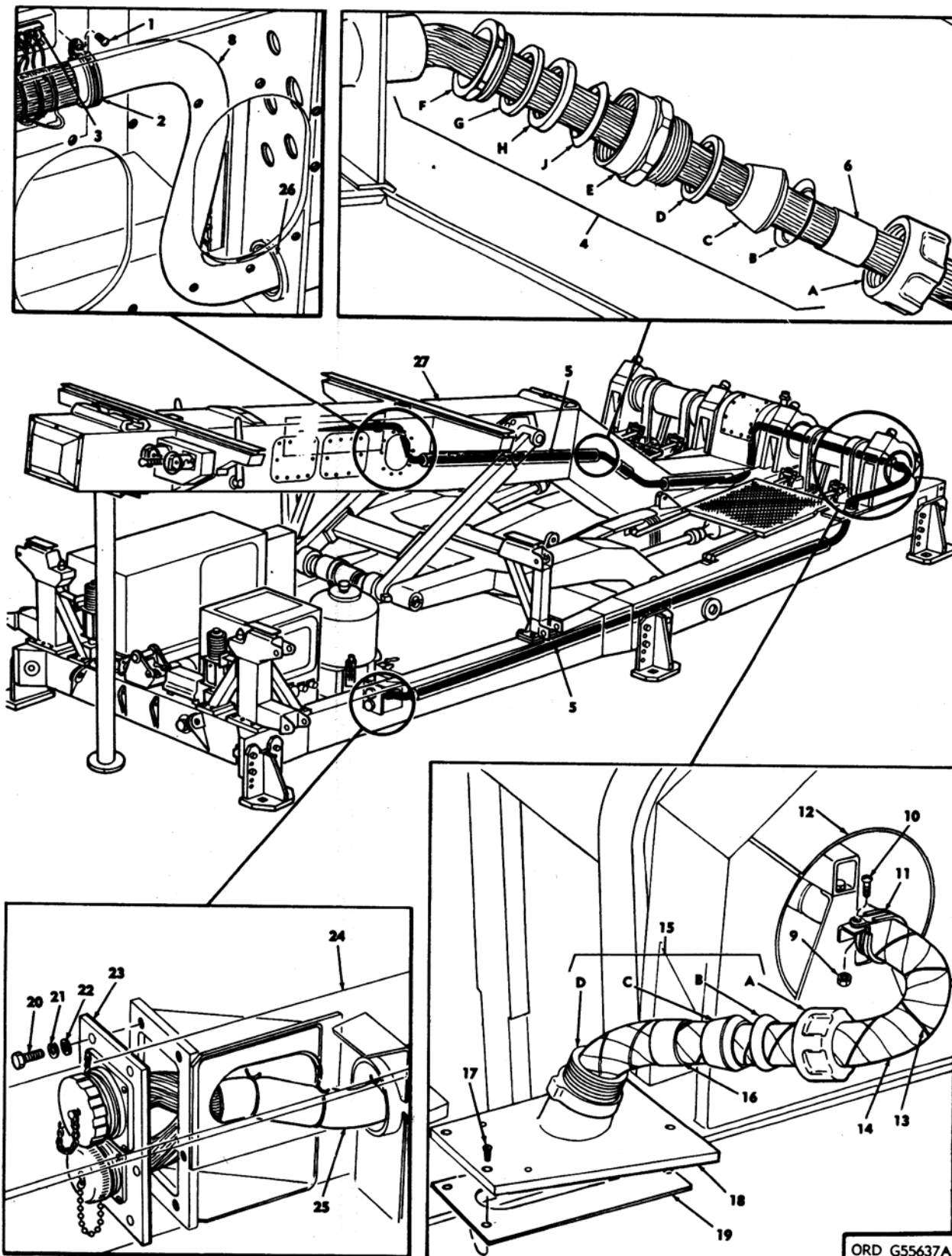


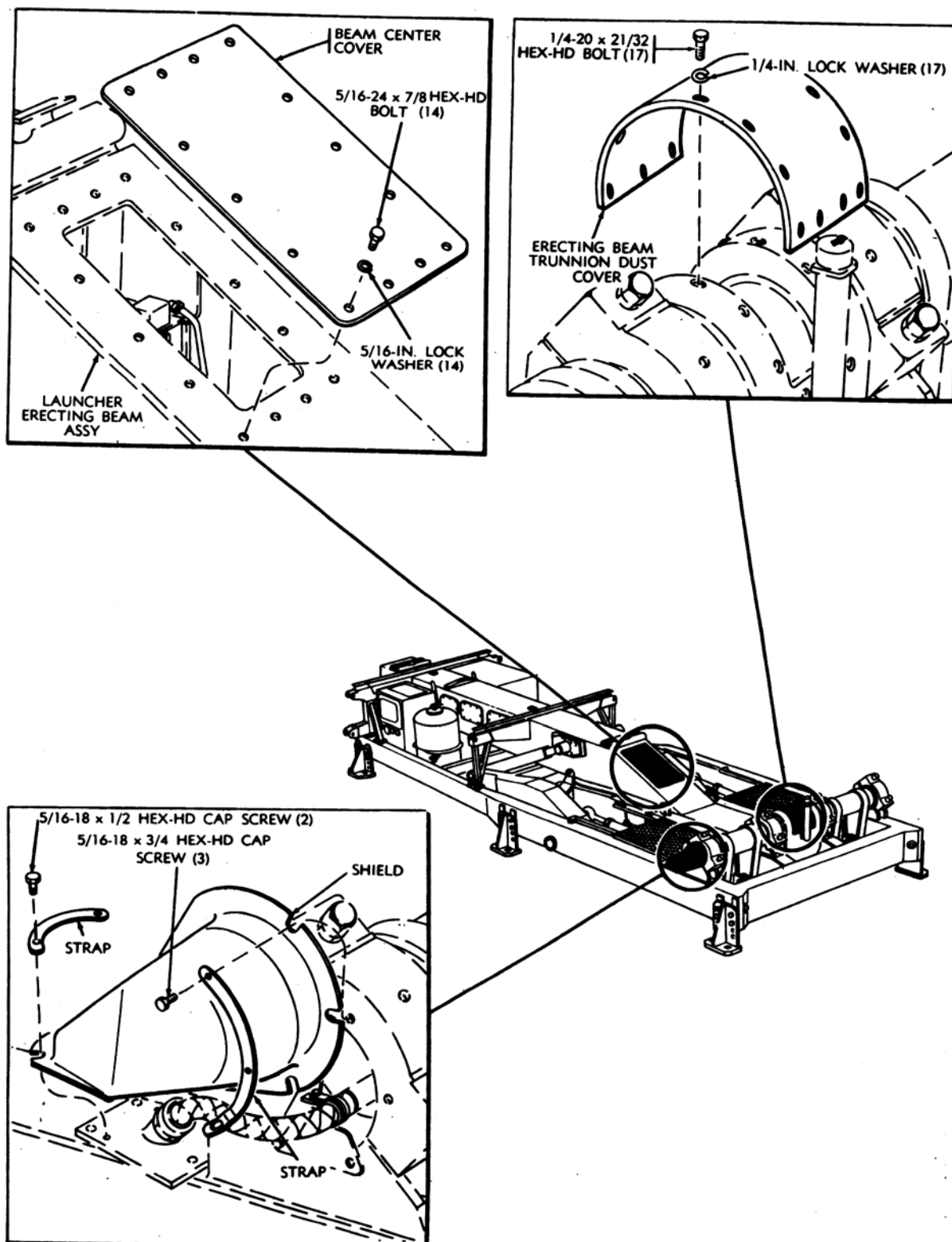
Figure 80. Launcher base cable assembly — removal and installation.

- 1 — No. 10-32 x  $\frac{3}{4}$  rd-hd screw
- 2 —  $1\frac{1}{8}$ -in-id clamp
- 3 — Terminal board
- 4 — Box connector assy
  - A — Pkg nut
  - B — Gland washer
  - C — Rubber bushing
  - D — Gasket
  - E — Body
  - F — Nut
  - G — Adapter
  - H — Grip ring seat
  - J — Grip ring
- 5 — Launcher base cable assy
- 6 — Bushing insulator
- 7 — (Deleted)
- 8 — Rubber tube
- 9 — No. 10-32 hex. nut
- 10 — No. 10-32 x  $\frac{1}{2}$  rd-hd screw
- 11 —  $1\frac{1}{8}$ -in-id clamp
- 12 — Trunnion
- 13 — Lock wire (10 feet)
- 14 —  $\frac{1}{8}$  x 3 insulation tape (6 feet)
- 15 — Adapter assy
  - A — Packing nut
  - B — Washer
  - C — Rubber bushing
  - D — Body
- 16 — Bushing insulator
- 17 —  $\frac{5}{16}$ -18 x  $\frac{3}{4}$  cross-recessed fl-hd screw (4)
- 18 — Support
- 19 — Rubber and cork gasket
- 20 —  $\frac{1}{4}$ -20 x  $\frac{1}{2}$  cap screw
- 21 —  $\frac{1}{4}$ -in-id lk washer (4)
- 22 —  $\frac{5}{16}$ -in-id x  $\frac{3}{4}$  od fl washer (4)
- 23 — Chassis
- 24 — Launcher base assy
- 25 —  $1\frac{1}{2}$ -in-id x 0.045 thk x 400 long insulation sleeving
- 26 — Conduit
- 27 — Launcher erecting beam assy

Figure 80. Launcher base cable assembly — removal and installation — legend.

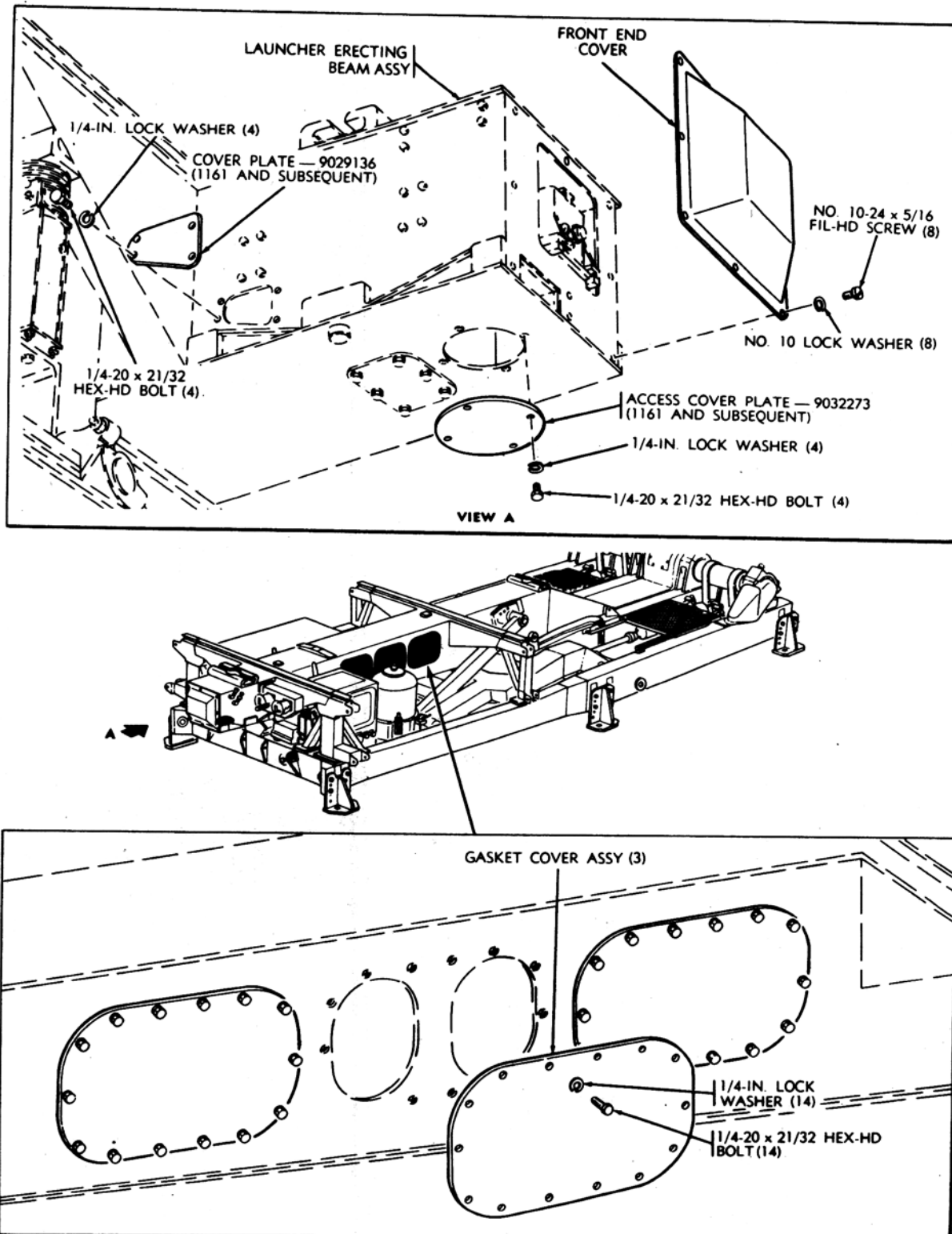
Figure 81. (Deleted)





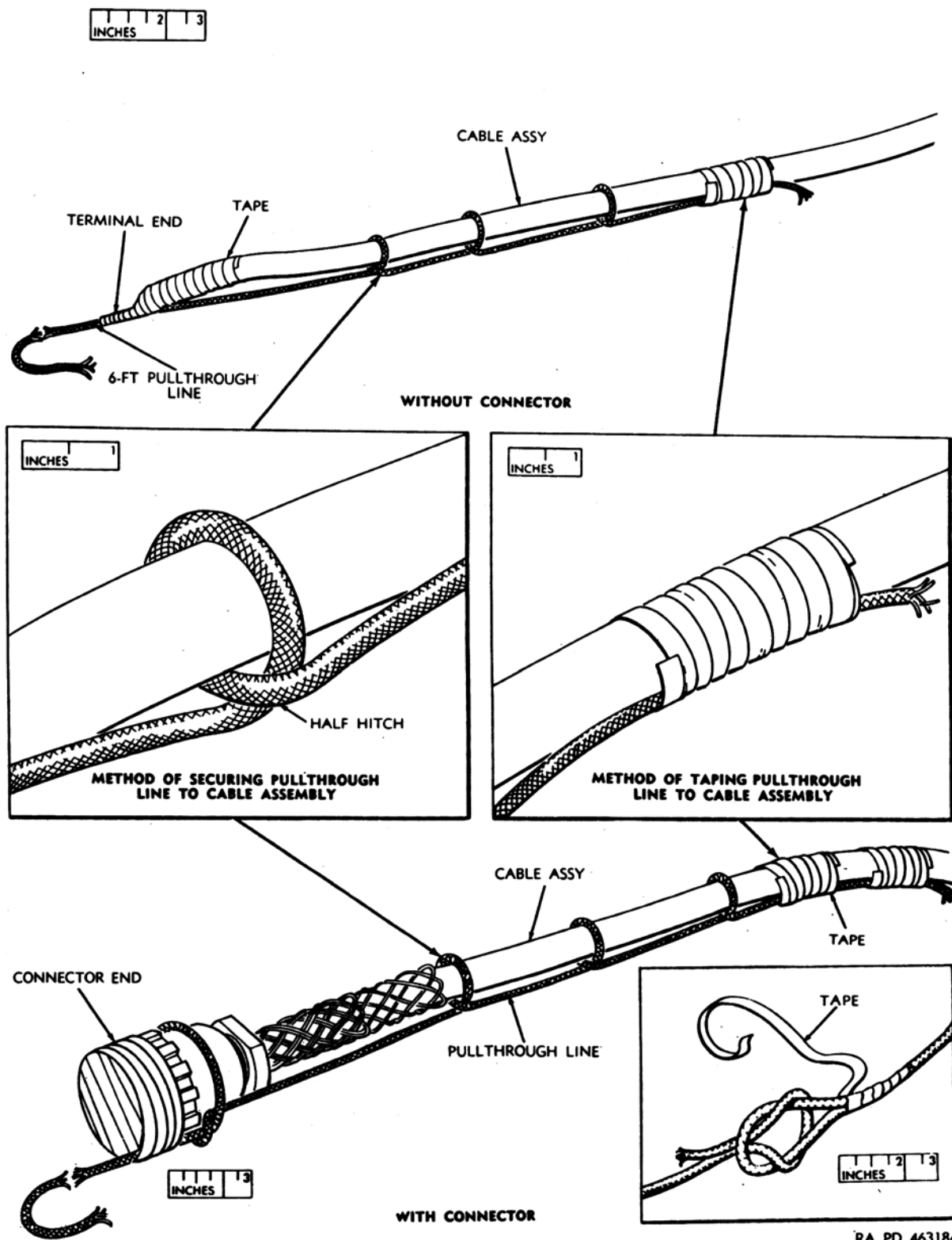
ORD G55638A

**Figure 82. Launcher base and launcher-erecting-beam access covers—removal and installation.**



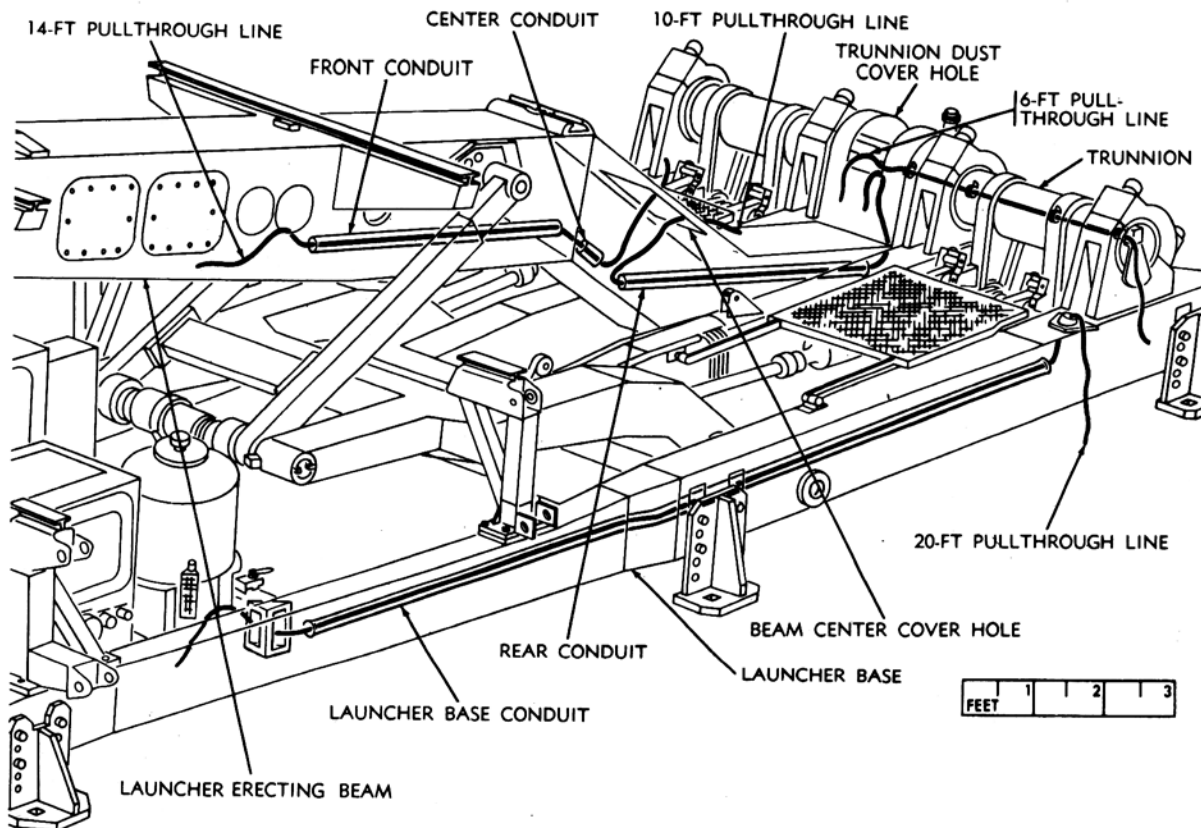
RA PD 464169A

Figure 83. Launcher base and launcher-erecting beam access covers—  
removal and installation—continued.



RA PD 463184

Figure 84. Pullthrough line - method of attachment.



RA PD 463995

Figure 85. Launcher base cable - pullthrough line location.

left end of trunnion (12) and remove tape (14).

**Caution:** Failure to exercise care when withdrawing cable assembly from trunnion (12) in following step may result in damage to clamps inside trunnion (12). Replacement of any damaged clamps is unusually difficult due to their inaccessibility inside the trunnion (12).

- (s) Carefully pull cable assembly (15) through clamps inside trunnion (12) and out left end of trunnion (12), assisting cable feed from access hole in center of trunnion (12).

**Note.** If clamps are broken during this operation, remove clamps as described in paragraph 89e (1) through (10). Install clamps as described in paragraph 89f (4) through (10).

- (t) Separate pullthrough line and cable lines, leaving pullthrough line in trunnion (fig. 85).
- (u) (Deleted.)
- (v) Loosen adapter assembly (15) and remove support (18) and rubber and cork gasket (19).
- (w) Tie a 20-foot pullthrough line (fig. 85) to cable line, securing free end and taping knot as before.
- (x) Remove cap screws (20) lockwashers (21), and flat washers (22) securing chassis (23) to launcher base assembly (24).
- (y) Remove cable assembly (5).
- (z) Separate pullthrough line and cable line, leaving pullthrough line in launcher base (fig. 85).



- (aa) Remove the insulation sleeving (25) from the launcher base cable assembly (5).

**Caution:** Use care not to damage tube and sleeving as it will be used when reinstalling cable assembly.

(2) *Installation.*

- (a) Install the insulation sleeving (25) on the launcher base cable assembly (5).
- (b) Attach a 6-foot pullthrough line to the terminal end of the cable assembly as outlined in step (1) (h) above and tie to the 20-foot pullthrough line (fig. 85) in the launcher base.
- (c) Pull the cable assembly through the launcher base conduit, assisting feed from the input end.
- (d) Separate the pullthrough lines.
- (e) Install the chassis (23) on the launcher base assembly (24).

*Note.* Secure the chassis to the launcher base assembly with the four cap screws (20) installed in the four upper mounting holes only, leaving the two lower threaded holes in the launcher base assembly open to permit accumulated water drainage.

- (f) Wrap the cable assembly between the support (18) and the trunnion with the insulation tape (14); secure the tape with the lockwire (13) as outlined in paragraph 38c.
- (g) Install the rubber and cork gasket (19), the support, and the adapter assembly (15).
- (h) Tie the 6-foot pullthrough line (fig. 85) in the trunnion to the line of the cable assembly and tape the knot as before.

**Caution:** Failure to exercise care when installing the cable assembly through the clamp (11) and other clamps inside the trunnion (12) in the following step may result in damage to the clamps. Replacement of any damaged clamp is unusually difficult due to their inaccessibility inside the trunnion (12).

- (i) Pull the cable assembly through the clamps inside the trunnion and out the trunnion dust cover hole (fig.

85), assisting the cable feed from the input end.

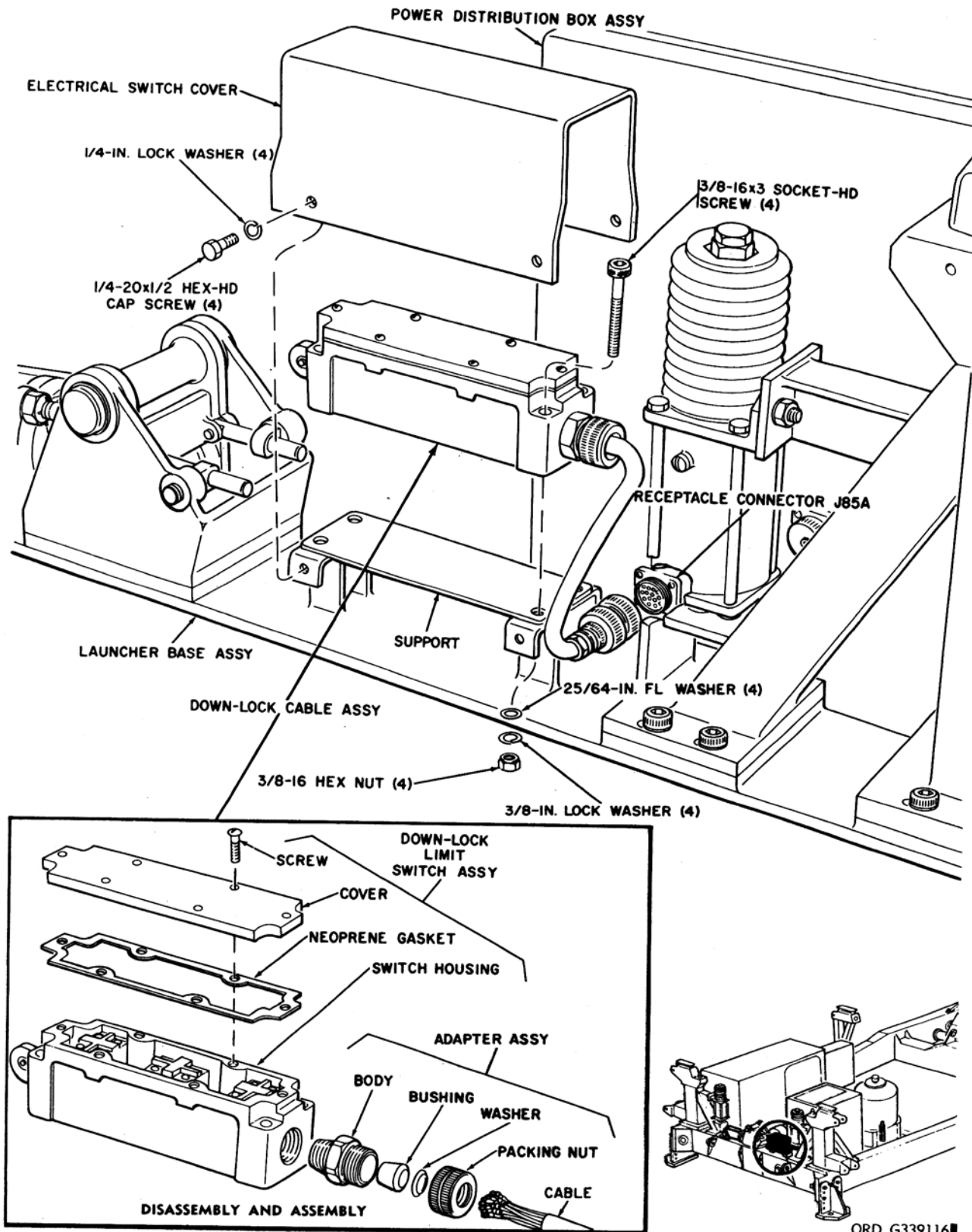
*Note.* If the clamps are broken during this operation, remove as outlined in paragraph 89e (1) through (10). Install the clamps as outlined in paragraph 89f (4) through (10).

- (j) Install the clamp (11) at the left end of the trunnion.
- (k) Separate the pullthrough lines and tie the 10-foot pullthrough line (fig. 85) to the line of cable assembly, taping the knot as before.
- (l) Pull the line and cable assembly through the rear conduit and out the beam center cover hole.
- (m) Separate the pullthrough lines.
- (n) Tie the 14-foot pullthrough line to the line of the cable assembly and tape the knot as before.
- (o) Pull the cable assembly through the center and front conduits (fig. 85) and the box connector assembly (4).
- (p) Install the box connector assembly.
- (q) Insert the rubber tube (8) 6 inches into the conduit (26) and around the cable assembly, sufficient to prevent chafing at the outlet of the conduit.
- (r) Wrap and tie the rubber tube to the cable assembly with the tape (7).
- (s) Remove the pullthrough lines (fig. 85).
- (t) Refer to TM 9-1440-250-35/1 and make the proper wiring connections to the terminal board (3).
- (u) Install the clamp (2).
- (v) Install the three gasket cover assemblies (fig. 83).
- (w) Install the beam center cover (fig. 82), the trunnion dust cover, and the shield.
- (x) Remove the erecting beam support as outlined in paragraph 36d.

*b. Down-Lock Cable Assembly (Including Switch Assembly).*

(1) *Removal.*

- (a) Install the erecting beam support as outlined in paragraph 36d.
- (b) Disconnect the cable assembly from receptacle connector J85A (fig. 86) on the power distribution box assembly.



ORD G339116

Figure 86. Down-lock cable assembly - removal and installation.

- (c) Remove electrical switch cover and cable assembly from support.
- (2) *Disassembly.* Disassemble down-lock limit switch assembly and adapter assembly.
- (3) *Assembly.*
  - (a) Position adapter assembly on cable.
  - (b) Refer to TM 9-1440-250-35/1; make proper wiring connections; and install down-lock limit switch assembly on cable.
  - (c) Install neoprene gasket and cover on switch assembly.
- (4) *Installation.*
  - (a) Install cable assembly on support.
  - (b) Install electrical switch cover.
  - (c) Connect cable assembly to receptacle connector J85A.
  - (d) Remove the erecting beam support -9029892 as described in paragraph 36d.
- (5) *Inspection, test, and adjustment.* Adjust switch assembly as described in TM 9-1440-250-20/1.

*c. Up-Lock Cable Assembly.*

- (1) *Removal.*
  - (a) Install the erecting beam support-9029892 as described in paragraph 36d.
  - (b) Remove cover (fig. 87) and rubber gasket on outlet.
  - (c) Remove covers and gaskets from both up-lock limit switch assemblies.
  - (d) Pull disconnected wires out through opening of conduit and tie a 3-foot pullthrough line, (fig. 84), to the wires as described in a (1) (h) 1 through 4 above.
  - (e) Tie a 5-foot pullthrough line (fig. 88) to line attached to cable assembly and tape knot to form tapers.
  - (f) Tie free end of line to any convenient object to prevent accidental pullthrough.

- (g) Remove conduit outlet cover (fig. 87) and rubber gasket from cross-member of launcher strut at lower end of upper flexible conduit assembly.
- (h) Pull cable assembly through flexible conduit assembly and separate pullthrough line and cable assembly line, leaving line in flexible conduit assembly.
- (i) Tie a 12-foot pullthrough line (fig. 88) to cable assembly line, securing free end and taping knot as before.
- (j) Remove strap (view A, fig. 87) conduit outlet cover, and rubber gasket.
- (k) Bend lower flexible conduit assembly and pull cable assembly out of conduit in strut.
- (l) Separate lines, leaving pullthrough line in conduit (fig. 88).
- (m) Tie a 5-foot pullthrough line to cable assembly line, securing free end and taping knot as before.
- (n) Disconnect lower flexible conduit assembly (view A, fig. 87) from base conduit.
- (o) Pull cable assembly out through flexible conduit assembly and separate lines, leaving pullthrough line in flexible conduit assembly.
- (p) Tie a 15-foot pullthrough line to cable assembly line, securing free end and taping knot as before.
- (q) Loosen adapter assembly (fig. 87) at end of base conduit and disconnect connector from receptacle connector J84A.
- (r) Pull cable assembly out through conduit and separate lines, leaving pullthrough line (fig. 88) in conduit.
- (s) Replace straps (fig. 87) on conduit as required.
- (2) *Installation.*
  - (a) Attach a 3-foot pullthrough line to

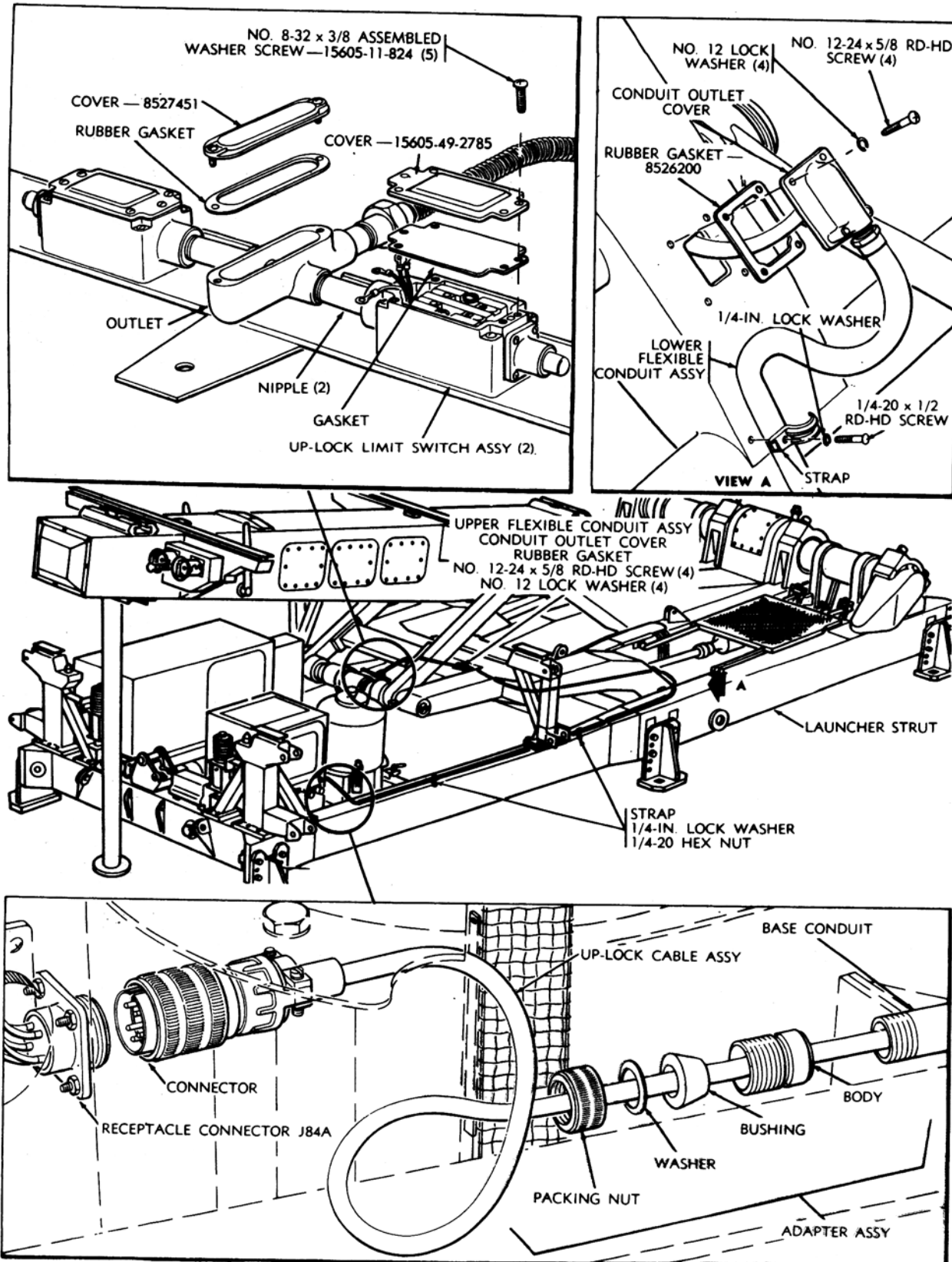
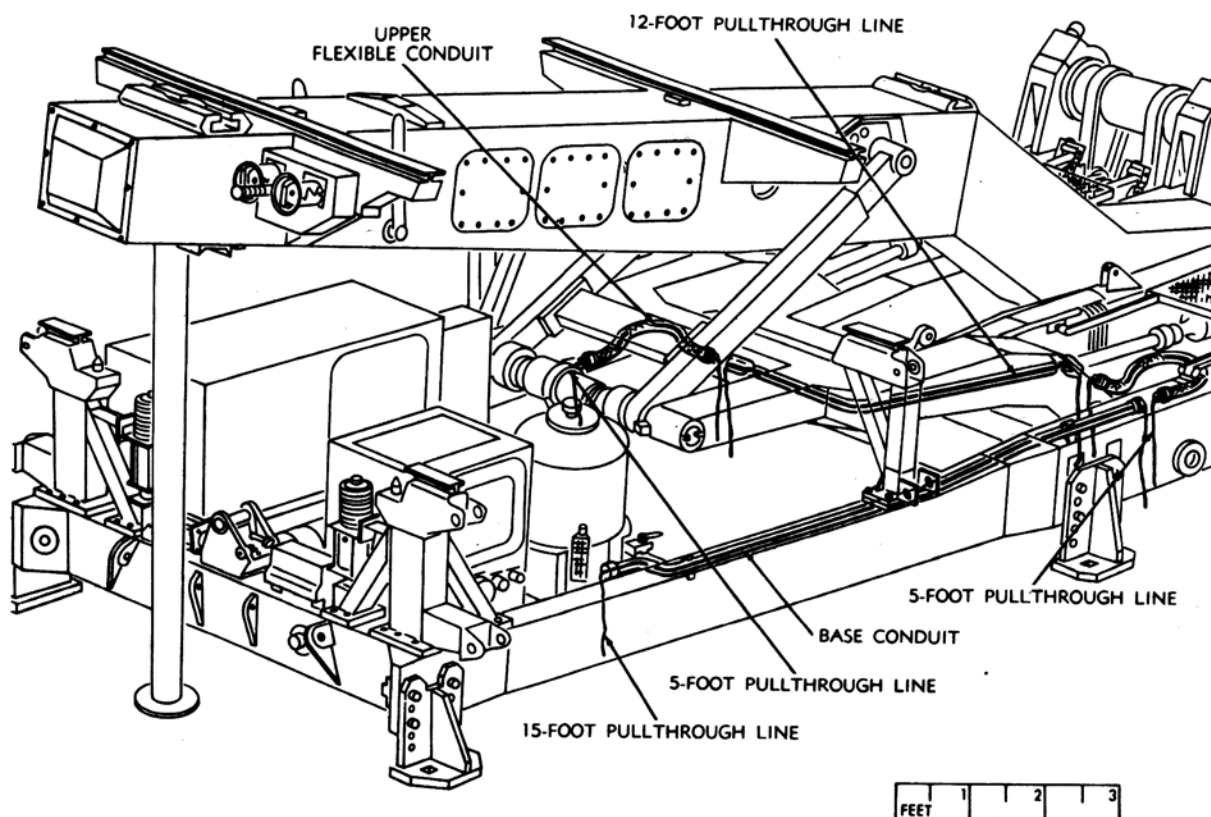


Figure 87. Up-lock cable assembly—removal and installation.

ORD G55639A



RA PD 463923

*Figure 88. Up-lock cable - pullthrough line location.*

- terminal end of up-lock cable assembly as described in *a* (1) (*h*) 1 through 4 above.
- (b) Tie the 15-foot pullthrough line (fig. 88) in launcher base conduit to line of cable assembly and tape knot to form tapers.
  - (c) Connect connector (fig. 87) to receptacle connector J84A.
  - (d) Pull cable assembly through base conduit.
  - (e) Separate pullthrough line and line of cable assembly, and tie 5-foot pullthrough line to line of cable assembly as before.
  - (f) Pull cable assembly through lower flexible conduit assembly (fig. 87).
  - (g) Separate pullthrough line and line of cable assembly, and tie 12-foot pullthrough line (fig. 88) in launcher strut (fig. 87) to line of cable assembly as before.
  - (h) Pull cable assembly through conduit of launcher strut and out through hole in crossmember of strut.
  - (i) Separate pullthrough line and line of cable assembly and tie pullthrough line in upper flexible conduit to line of cable assembly as before.
  - (j) Pull cable assembly through flexible conduit and out the outlet.
  - (k) Remove lines and tape from cable assembly and feed wires of cable assembly through nipples to appropriate limit switch assembly.

- (l) Refer to TM 9-1440-250-35 and make proper wire connections.
- (m) Install rubber gaskets and covers.
- (n) Pull slack from cable assembly through end of upper flexible conduit, through lower flexible conduit, and through base conduit.
- (o) Install adapter assembly and tighten packing nut.
- (p) Install strap (view A) to lower flexible conduit.
- (q) Install rubber gaskets, cover, and conduit outlet cover at upper and lower flexible conduits.
- (r) Install rubber gasket and cover on outlet.
- (s) Install connector on receptacle connector J84A.
- (t) Remove the erecting beam support -9029892 as described in paragraph 36d.

d. *Up-lock Limit Switch Group.* The up-lock limit switch group consists of two up-lock limit switches (fig. 89) and two up-lock limit switch mechanical linkages between the limit switches and the hydraulic up-lock assembly. Maintenance of the limit switches is described in (1) below, while a typical removal and installation of a mechanical linkage is described in (2) below.

(1) *Up-lock limit switch.*

(a) *Removal.*

- 1. Install the erecting beam support -9029892 as described in paragraph 36d.
- 2. Open the EQUILIBRATOR SYSTEM BYPASS valve (fig. 60) and system bypass valve.
- 3. Depressurize the hydraulic oil reservoir by turning the handle of the plug cock to the VENT position and holding until all pressure is discharged.
- 4. Remove clamp (fig. 199) and two tube assemblies attached to hy-

draulic up-lock assembly and cap exposed lines.

- 5. Remove covers (fig. 89) and rubber gaskets from limit switches.
- 6. Remove cover and rubber gasket from conduit outlet.
- 7. Remove both switches from crossmember.
- 8. Remove switches.

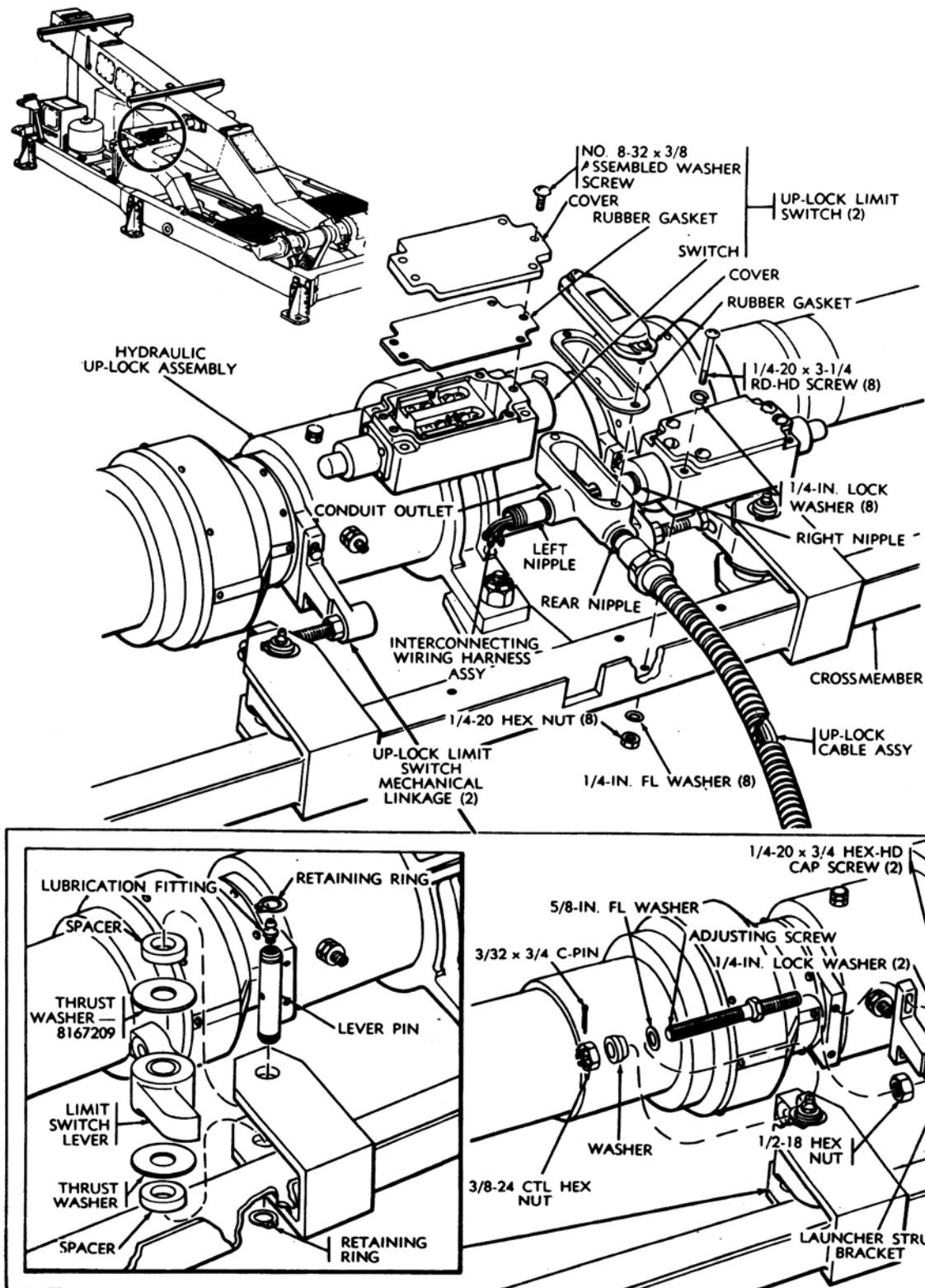
(b) *Installation.*

- 1. Install up-lock limit switches on left and right nipples.
- 2. Refer to TM 9-1440-250-35 and make proper wire connections.
- 3. Install rubber gaskets and covers on both switches and the conduit outlet.
- 4. Remove caps and install clamp (fig. 199) and two tube assemblies. Torque coupling nuts of two tube assemblies to 200 pound-inches.
- 5. Close the EQUILIBRATOR SYSTEM BYPASS valve (fig. 60) and system bypass valve.
- 6. Pressurize the hydraulic oil reservoir to 20 psi by turning the handle of the plug cock to the AIR position.
- 7. Perform air bleed procedures as described in paragraph 43.
- 8. Adjust limit switch levers (fig. 89) as described in TM 9-1440-250-20.
- 9. Remove the erecting beam support -9029892 as described in paragraph 36d.

(2) *Up-lock limit switch mechanical linkage.*

(a) *Removal.*

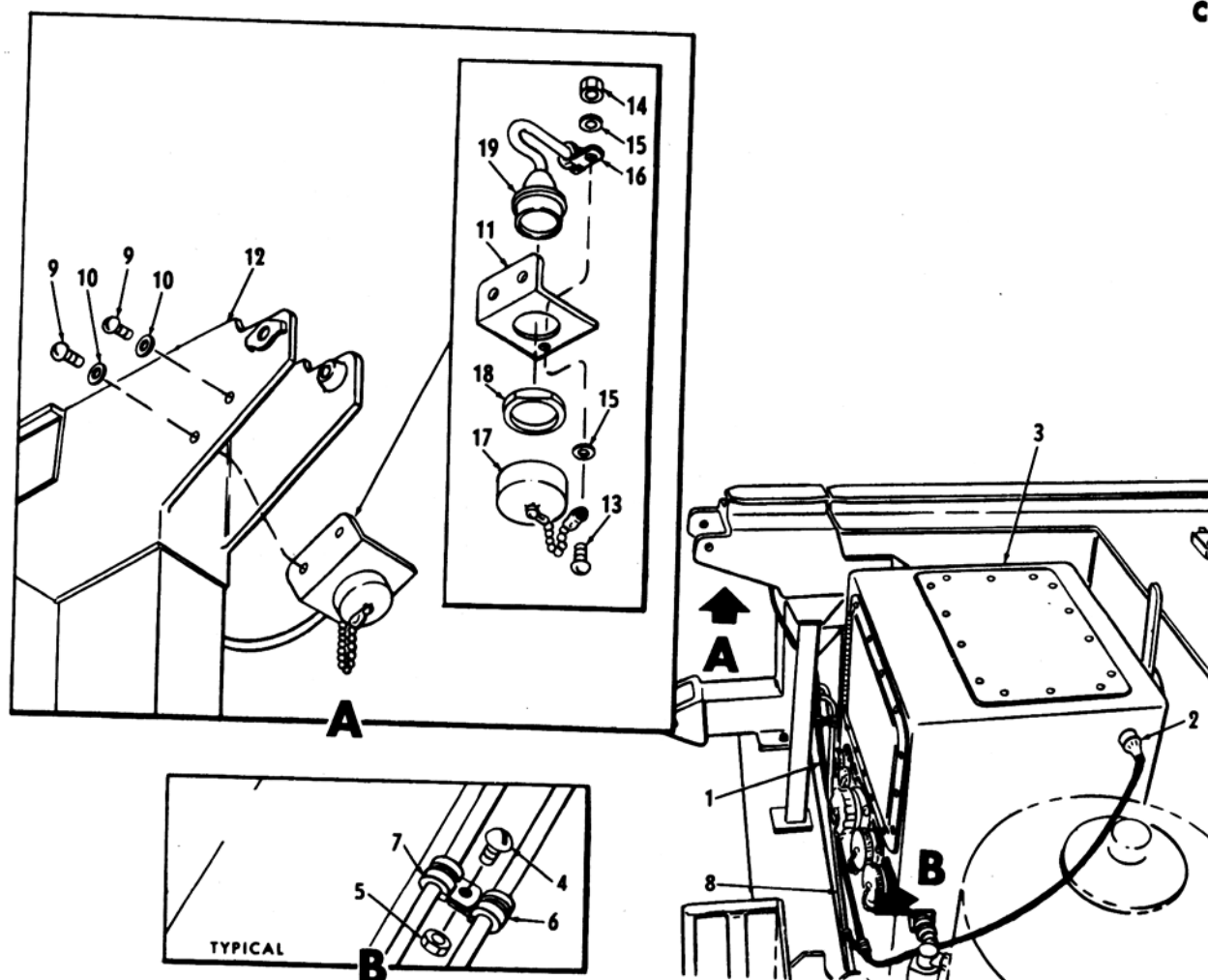
- 1. Install the erecting beam support -9029892 as described in paragraph 36d.
- 2. Remove mechanical linkage group (fig. 89).



RA PD 464141A

Figure 89. Up-lock limit switch group—removal and installation.





ORD G292623

- 1—Telephone-jack extension cable assembly 9978888
- 2—Receptacle connector J3B
- 3—Power distribution box
- 4—No. 8-32 x 1/2 pan-hd screw
- 5—No. 8-32 self-lkg hex. nut
- 6—Clamp MS21919DG4
- 7—Clamp MS21919DG6
- 8—Tube assembly
- 9—No. 10-32 x 3/4 pan-hd screw (2)
- 10—No. 10 flatwasher (2)
- 11—Bracket

- 12—Rack support assembly
- 13—No. 6-32 x 5/8 pan-hd screw
- 14—No. 6-32 self-lkg hex. nut
- 15—No. 6 flatwasher
- 16—Clamp MS21919DG4
- 17—Cover
- 18—1-32 mounting nut (p/o telephone-jack extension cable assembly 9978888)
- 19—Receptacle connector J3C (p/o telephone-jack extension cable assembly 9978888)

Figure 89.1. Telephone-jack extension cable assembly—removal and installation.

(b) Installation.

1. Install the mechanical linkage.
2. Adjust the limit switch levers as described in TM 9-1440-250-20/1.
3. Remove the erecting-beam support as described in paragraph 36d.

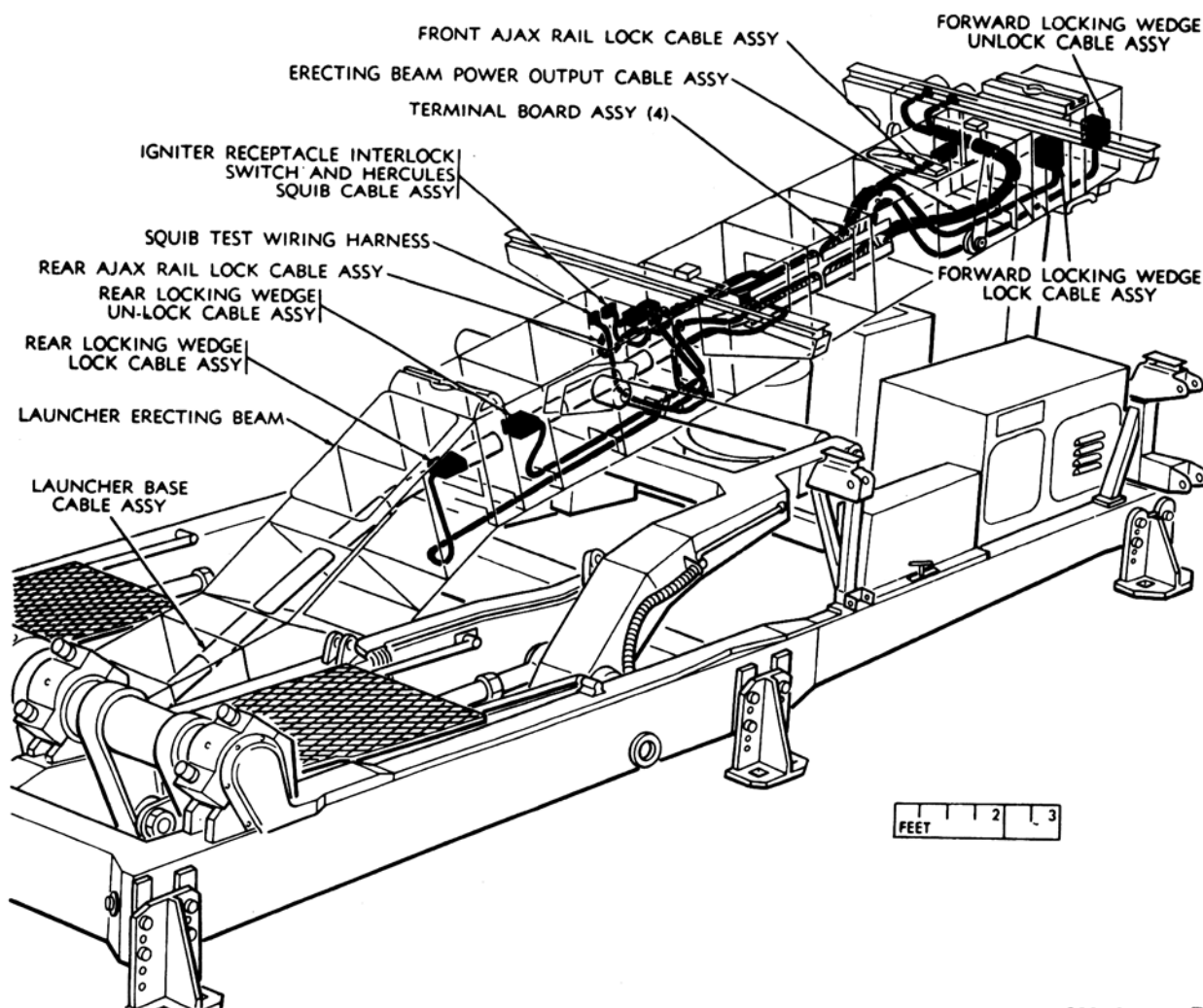
e. Telephone-Jack Extension Cable Assembly.

Note. The key numbers shown in parentheses in (1) and (2) below refer to figure 89.1.

(1) Removal.

- (a) Install the erecting-beam support as described in paragraph 36d.
- (b) Disconnect the telephone-jack extension cable assembly (1) from receptacle connector J3B (2) on the side of the power distribution box (3).





ORD G297758 ■

Figure 90. Launcher erecting beam electrical system—major components.

- (c) Remove the clamps (6 and 7) that secure the cable assembly to the tube assembly (8).
  - (d) Remove the bracket (11) from the rack support assembly (12).
  - (e) Remove the clamp (16) that secures the cable assembly to the bracket, and remove the cover (17).
  - (f) Remove the mounting nut (18) and remove receptacle connector J3C (19) from the bracket.
- (2) *Installation.*
- (a) Position receptacle connector J3C (19) through the hole in the bracket (11) and secure with the mounting nut (18).
  - (b) Install the cover (17) on the connector and the clamp (16) on the telephone-jack extension cable assembly (1). Secure the cover and the clamp to the bracket.
  - (c) Install the bracket on the rack support assembly (12).
  - (d) Secure the cable assembly to the tube assembly (8) with the clamps (6 and 7).
  - (e) Connect the cable assembly to receptacle connector J3B (2) on the side of the power distribution box (3).
  - (f) Remove the erecting beam support as described in paragraph 36d.

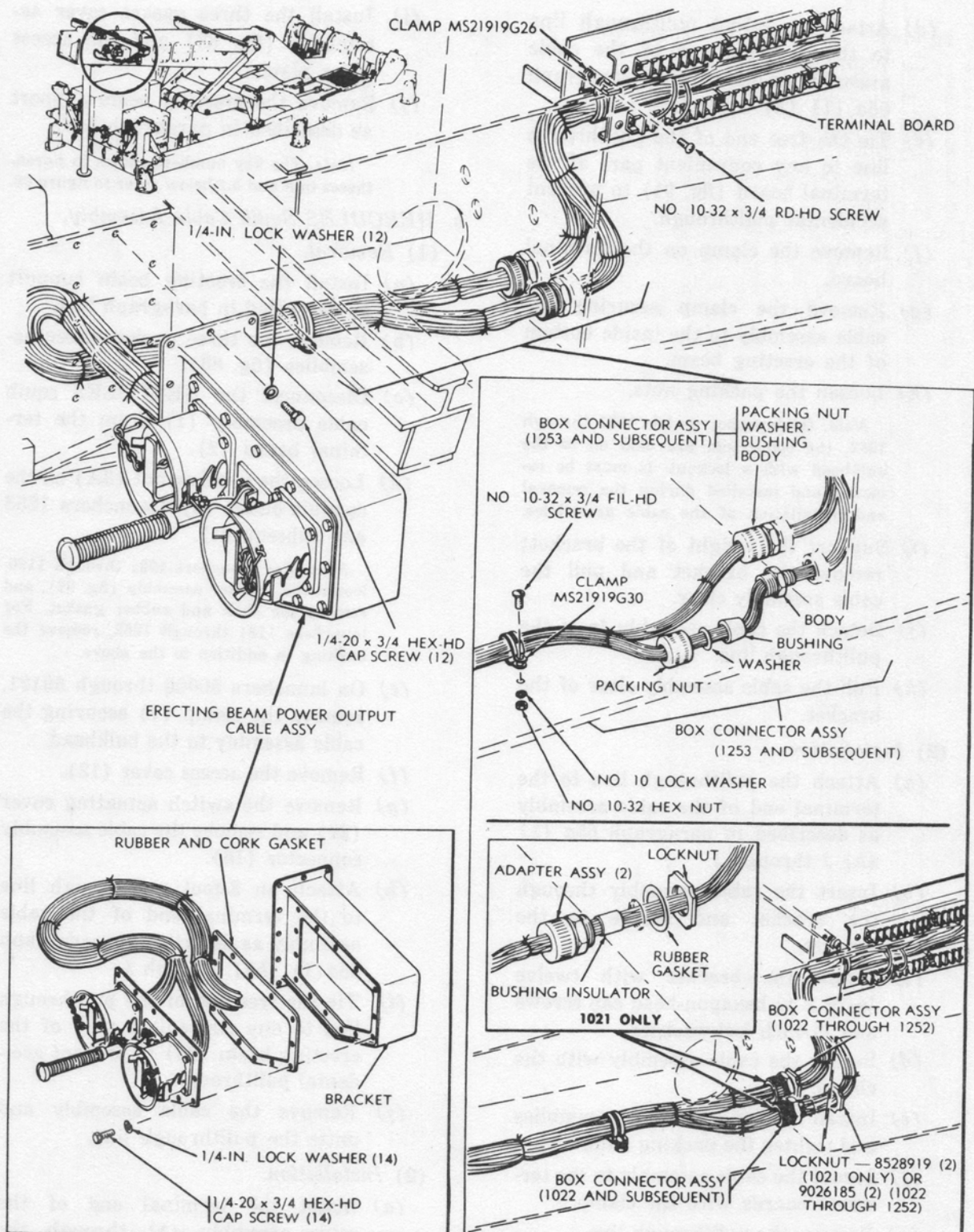
## 66. Launcher Erecting Beam Electrical Components

The major electrical components of the launcher erecting beam (fig. 90) are the erecting beam power output cable assembly, HERCULES squib cable assembly, igniter receptacle interlock switch, forward locking wedge cable assemblies, rear locking wedge cable assemblies, front AJAX rail lock cable assembly, rear AJAX rail lock cable assembly, squib test wiring harness, and the terminal board assemblies.

### *a. Erecting Beam Power Output Cable Assembly.*

#### (1) *Removal.*

- (a) Install the erecting beam support as described in paragraph 36d.
- (b) Remove the three gasket cover assemblies (fig. 83) and the access cover plate.
- (c) Disconnect the cable assembly (fig. 91) from the terminal board.



RA PD 464058A

Figure 91. Erecting beam power output cable assembly—removal and installation.

- (d) Attach an 8-foot pullthrough line to the terminal end of the cable assembly as described in paragraph 65a (1) (h) 1 through 4.
- (e) Tie the free end of the pullthrough line to any convenient part of the terminal board (fig. 91) to prevent accidental pullthrough.
- (f) Remove the clamp on the terminal board.
- (g) Remove the clamp securing the cable assembly to the inside bottom of the erecting beam.
- (h) Loosen the packing nuts.

*Note.* On launcher models 1021 through 1252, the connectors are held on to the bulkhead with a locknut. It must be removed and installed during the removal and installation of the cable assemblies.

- (i) Support the weight of the bracket; remove the bracket and pull the cable assembly clear.
- (j) Detach the cable assembly from the pullthrough line.
- (k) Pull the cable assembly clear of the bracket.

## (2) Installation.

- (a) Attach the pullthrough line to the terminal end of the cable assembly as described in paragraph 65a (1) (h) 1 through 4.
- (b) Insert the cable assembly through the bracket and secure to the bracket.
- (c) Install the bracket with twelve  $\frac{1}{4}$ -20 x  $\frac{3}{4}$  hexagon-head cap screws and  $\frac{1}{4}$ -inch lockwashers.
- (d) Secure the cable assembly with the clamp.
- (e) Install the box connector assemblies and tighten the packing nuts.
- (f) Secure the cable assembly to the terminal boards with the clamp.
- (g) Remove the pullthrough line.
- (h) Refer to TM 9-1440-250-35/1 and make the proper wire connections.

- (i) Install the three gasket cover assemblies (fig. 83) and the access cover plate.
- (j) Remove the erecting beam support as described in paragraph 36d.

*Note.* The key numbers shown in parentheses in b and b.1 below refer to figure 92.

## b. HERCULES Squib Cable Assembly.

### (1) Removal.

- (a) Install the erecting beam support as described in paragraph 36d.
- (b) Remove the three gasket cover assemblies (fig. 83).
- (c) Disconnect the HERCULES squib cable assembly (1) from the terminal board (2).
- (d) Loosen the packing nut (3A) on the conduit outlet (3) (launchers 1253 and subsequent).

*Note.* For launchers 1021 through 1160, loosen the adapter assembly (fig. 93), and remove the shell and rubber gasket. For launchers 1161 through 1252, remove the bushing in addition to the above.

- (e) On launchers 50000 through 50121, remove the clamp (7) securing the cable assembly to the bulkhead.
- (f) Remove the access cover (13).
- (g) Remove the switch actuating cover (21) and remove the cable assembly connector (18).
- (h) Attach an 8-foot pullthrough line to the terminal end of the cable assembly as described in paragraph 65a(1) (h) 1 through 4.
- (i) Tie the free end of the pullthrough line to any convenient part of the erecting beam (26) to prevent accidental pullthrough.
- (j) Remove the cable assembly and untie the pullthrough line.

### (2) Installation.

- (a) Insert the terminal end of the cable assembly (1) through the connector mounting hole into the erecting beam (26).

- (b) Attach the pullthrough line to the terminal end of the cable assembly as described in paragraph 65a(1)(h)1 through 4.
- (c) Pull the cable assembly through the conduit outlet (3). Refer to TM 9-1440-250-35 to make the proper connections.
- (d) Install the cable assembly connector (18) and install the switch actuating cover (21).
- (e) Install the access cover (13).
- (f) Tighten the packing nut (3A) on the conduit outlet (launchers 1253 and subsequent).

*Note.* For launchers 1021 through 1160, install the rubber gasket (fig. 93), shell, and adapter assembly. For launchers 1161 through 1252, install the bushing in addition to the above.

- (g) On launchers 50,000 through 50,121, install the clamp (7).

- (h) Remove the pullthrough line.
  - (i) Install the three gasket cover assemblies (fig. 83).
  - (j) Remove the erecting beam support as described in paragraph 36d.
- b.1. *Igniter Receptacle Interlock Switch.*

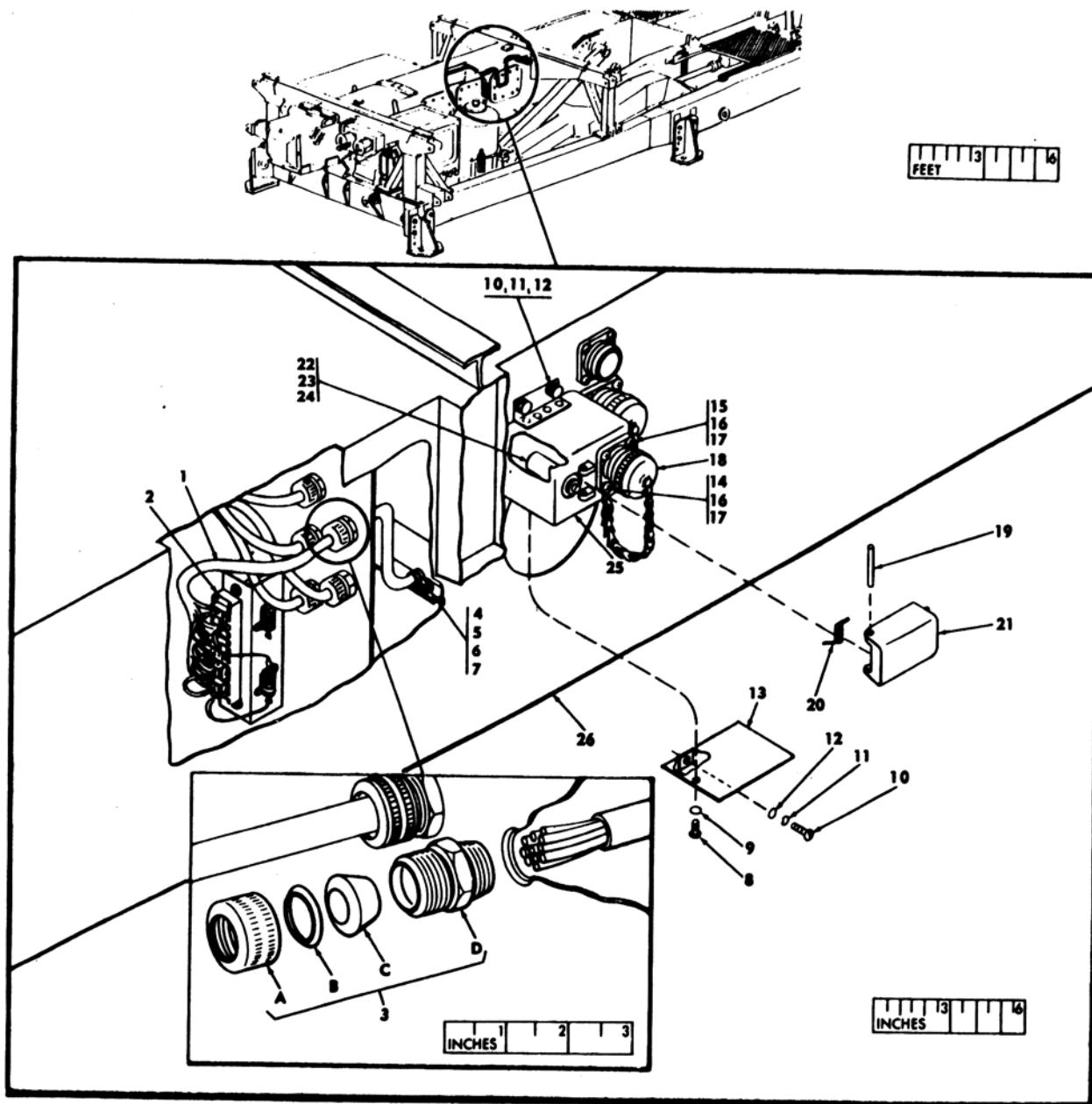
(1) *Removal.*

- (a) Remove the switch actuating cover (21) and the access cover (13).
- (b) Tag and disconnect the wires from the igniter receptacle interlock switch (24).
- (c) Remove the switch.

(2) *Installation.*

- (a) Install the switch (24) on the switch box (25).
- (b) Connect the wires to the switch.
- (c) Install the access cover (13) and the switch actuating cover (21).





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- |   |   |
|---|---|
| 1—HERCULES squib cable assembly                               | 12—1/4 fl washer (3)  |
| 2—Terminal board  | 13—Access cover   |
| 3—Conduit outlet (launchers 1253 and subsequent)              | 14—No. 6-32 x 1/2 pan-hd screw  |
| A—Packing nut   | 15—No. 6-32 x 7/16 pan-hd screw (3)                                   |
| B—Washer  | 16—No. 6-32 hex. nut (4)  |
| C—Bushings  | 17—No. 6 lockwasher (4)   |
| D—Body  | 18—Cable assembly connector   |
| 4—No. 10-24 x 3/4 fl-hd screw (launchers 50000 through 50121) | 19—0.117 dia x 2 hinge pin  |
| 5—No. 10-24 hex. nut (launchers 50000 through 50121)          | 20—Spring   |
| 6—No. 10 lockwasher (launchers 50000 through 50121)           | 21—Switch actuating cover   |
| 7—Clamp (launchers 50000 through 50121)                       | 22—5/8-24 hex. nut (p/o igniter receptacle interlock switch)          |
| 8—No. 8-32 x 1/2 pan-hd screw (2)                             | 23—5/8 int-teeth lockwasher (p/o igniter receptacle interlock switch) |
| 9—No. 8 fl washer (2)   | 24—Igniter receptacle interlock switch                                |
| 10—1/4-28 x 1/2 hex-hd bolt (3)                               | 25—Switch box   |
| 11—1/4 lockwasher (3)   | 26—Launcher erecting beam   |

Figure 92. HERCULES squib cable assembly and igniter receptacle interlock switch—removal and installation.

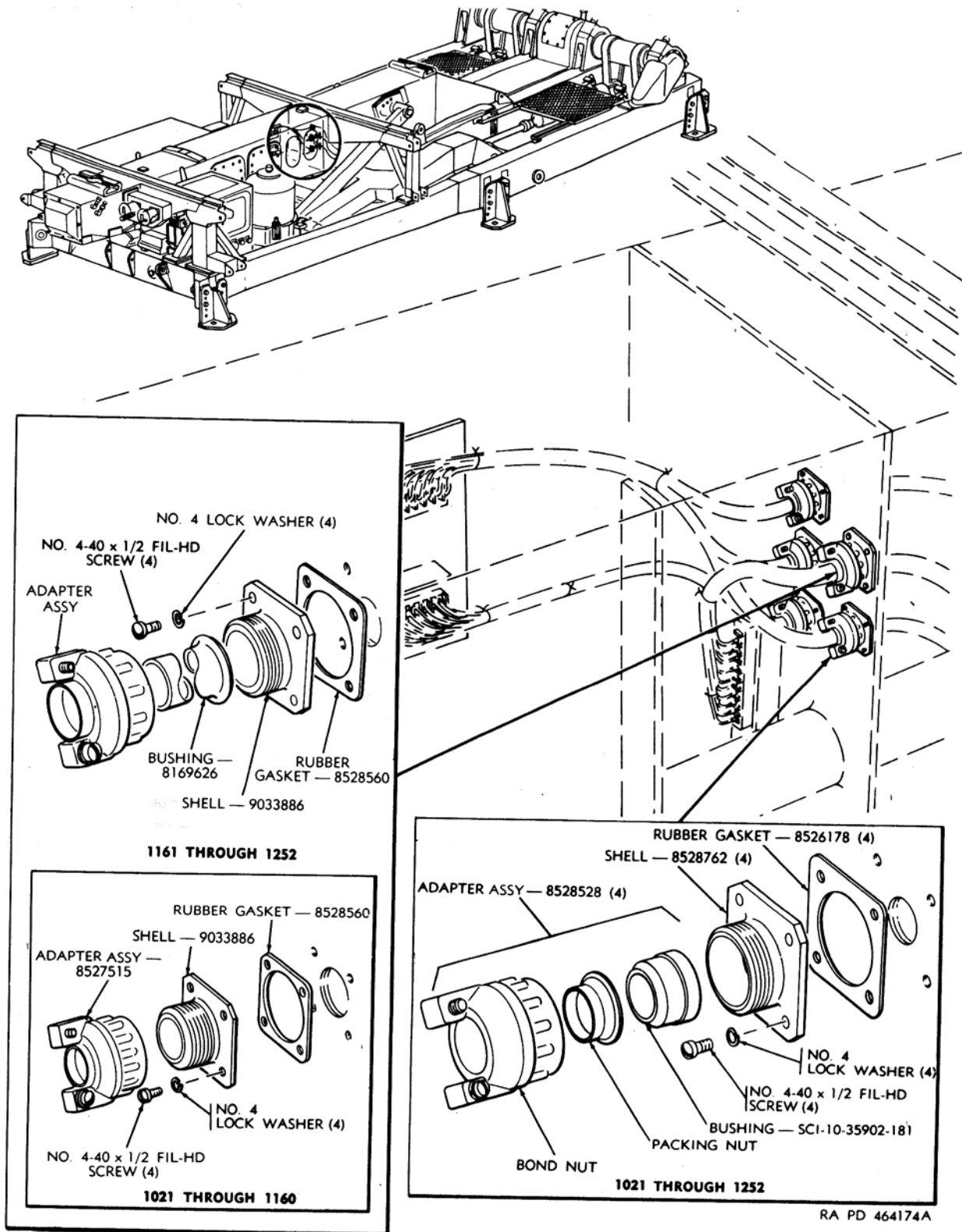


Figure 93. Erecting-beam-bulkhead electrical connectors (1021 through 1252).



*c. Resistor Cable Assembly Bracket Group.*

(1) *Removal.*

- (a) Install the erecting beam support as described in paragraph 36d.
- (b) Remove the three gasket cover assemblies (fig. 83).
- (c) Remove the resistor cable assembly bracket group (fig. 94).

(2) *Disassembly.* Disassemble the bracket group.

(3) *Assembly.* Assemble the bracket group.

(4) *Installation.*

- (a) Install the bracket group.
- (b) Install the three gasket cover assemblies (fig. 83).
- (c) Remove the erecting beam support as described in paragraph 36d.

*d. Forward Locking Wedge Lock Cable Assembly.* Removal and installation of the forward locking wedge lock cable assembly (fig. 95) provides for maintenance of the attached switch assembly and all configurations of the box connector assembly.

(1) *Removal.*

- (a) Install the erecting beam support as described in paragraph 36d.
- (b) Remove the gasket cover assemblies (fig. 83) at the front and center, and the front end cover.
- (c) Remove the switch (fig. 95) from the erecting beam assembly by removing the four hexagon-head screws and lockwashers.

(d) Disconnect the clamps (fig. 96) that secure the lock cable assembly to the terminal board.

(e) Attach a 10-foot pullthrough line to the terminal end of the cable assembly as described in paragraph 65a(1) (h) 1 through 4.

(f) Tie the free end of the pullthrough line to any convenient part of the erecting beam assembly to prevent accidental pullthrough.

(g) Loosen the bondnut (fig. 95), packing nut, and bushing on the adapter assembly; detach the shell and rubber gasket from the bulkhead (for launchers 1021 through 1252).

(h) Loosen the packing nut and the locknut on the connector assembly at the bulkhead (for launchers 1253 and subsequent).

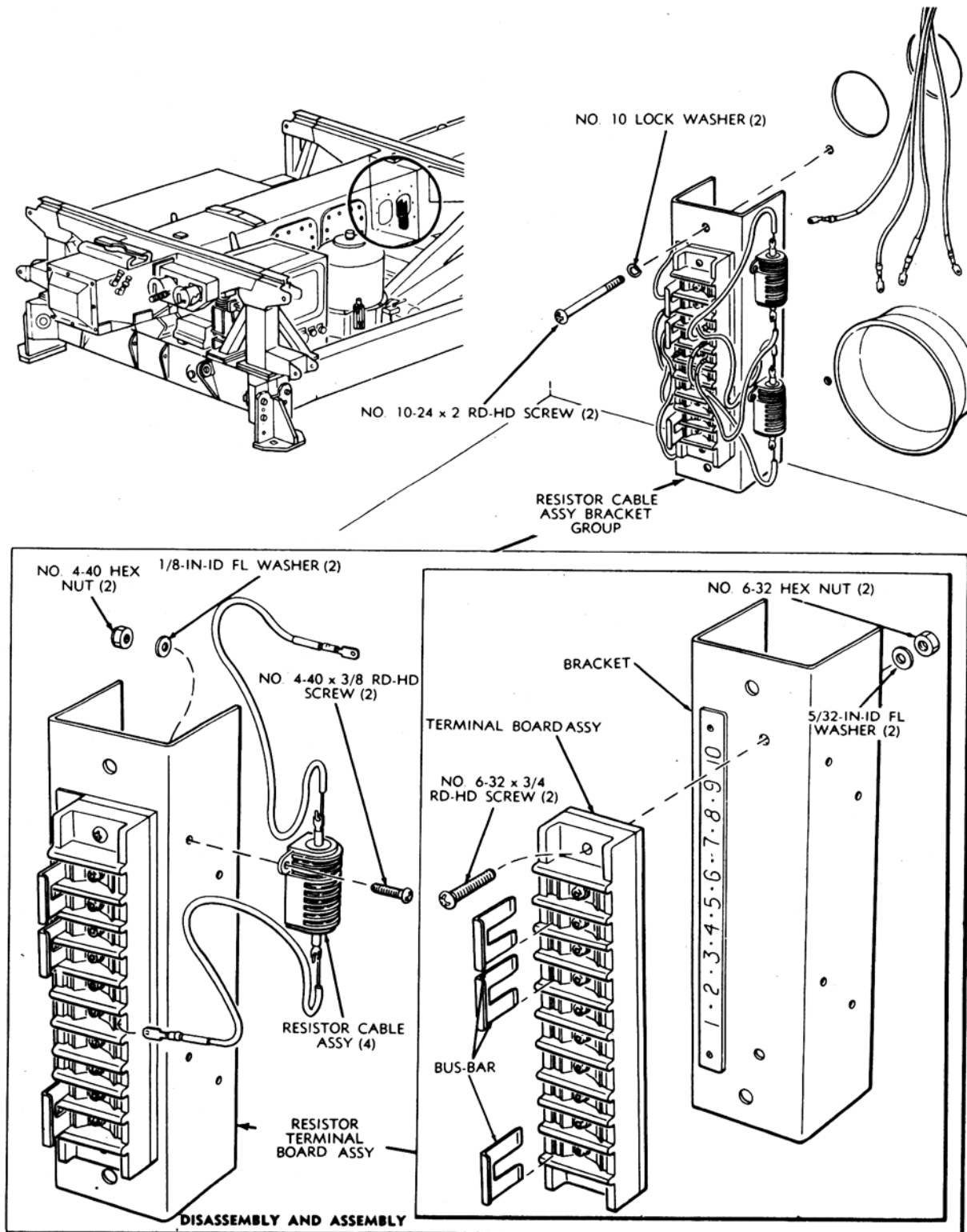
(i) Pull the lock cable assembly from the erecting beam assembly and remove the pullthrough line from the cable assembly.

(2) *Disassembly.* Disassemble the lock cable assembly.

(3) *Assembly.* Refer to TM 9-1440-250-35/1 to make the proper wire connections, and assemble the lock cable assembly.

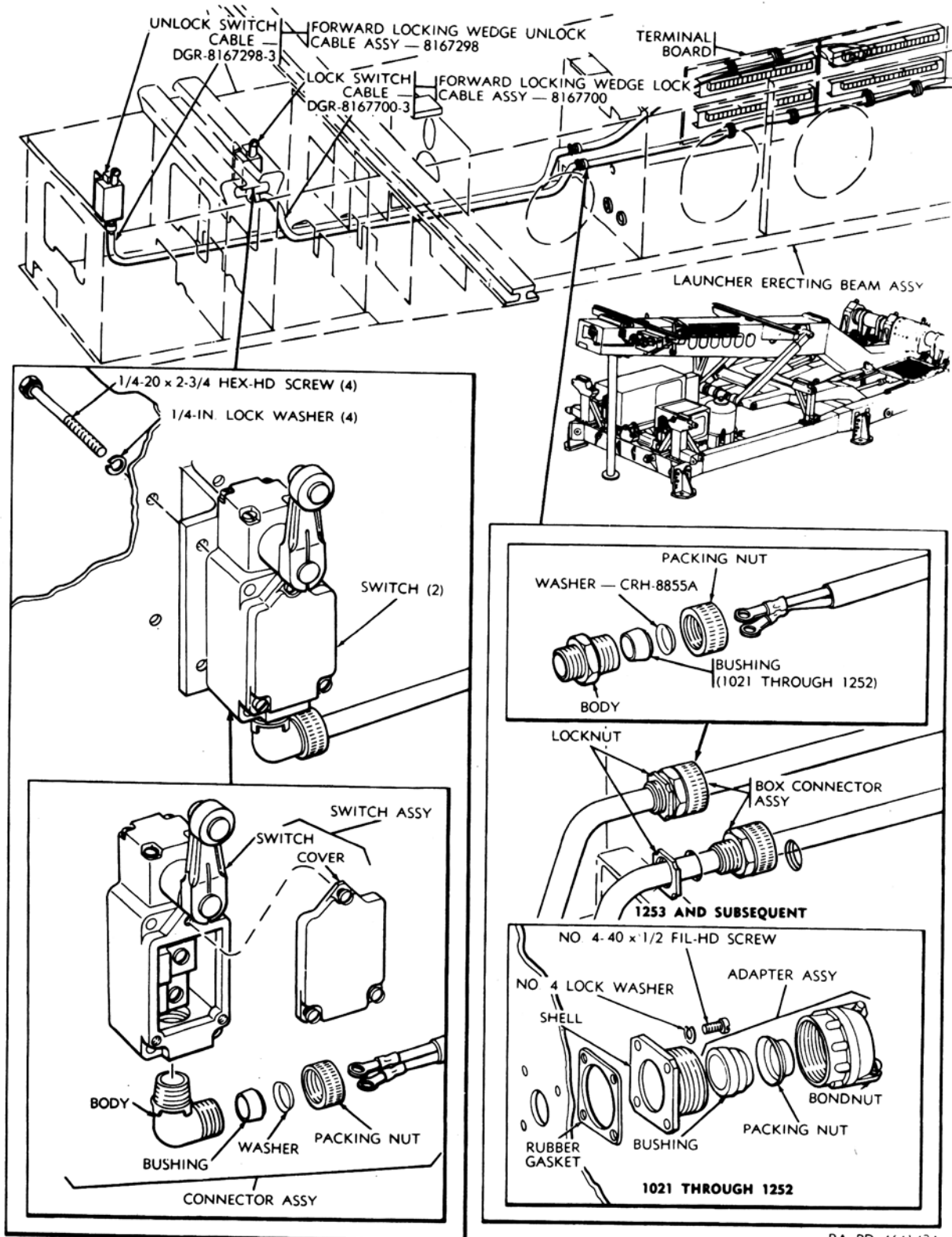
(4) *Installation.*

- (a) Attach the pullthrough line to the lock cable assembly as described in paragraph 65a (1) (h) 1 through 4.



RA PD 463974A

Figure 94. Resistor cable assembly bracket group—removal and installation.



RA PD 464143A

Figure 95. Forward locking wedge cable assemblies—removal and installation.

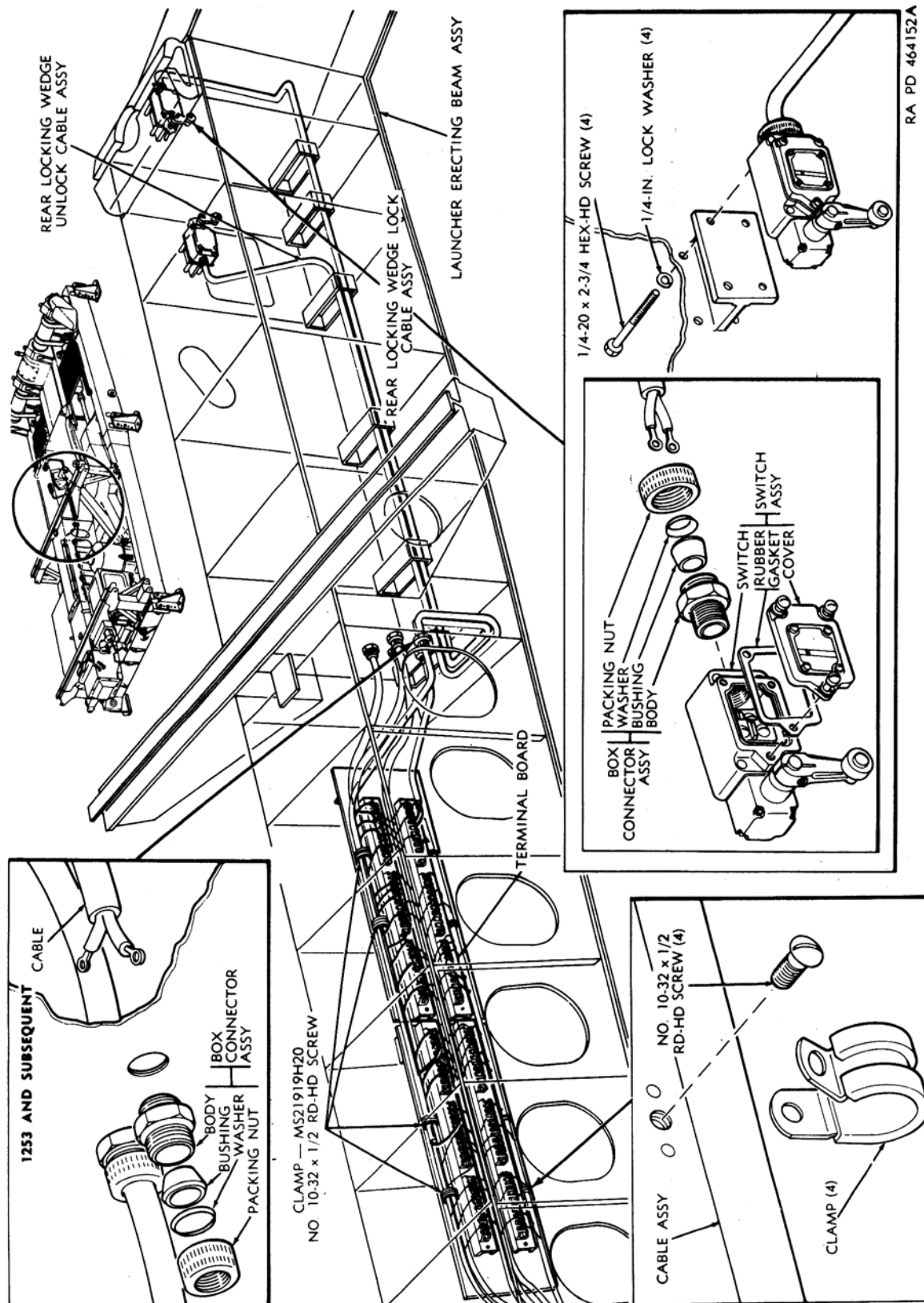


Figure 96. Rear locking wedge cable assemblies—removal and installation.

- (b) Pull lock cable assembly through launcher erecting beam assembly, and detach pullthrough line.
  - (c) Refer to TM 9-1440-250-35 and make proper wiring connections to terminal board.
  - (d) Install clamps (fig. 96) that secure lock cable assembly (fig. 95).
  - (e) Install switch assembly on erecting beam assembly with four  $\frac{1}{4}$ -20 x  $2\frac{3}{4}$  hexagon-head screws and  $\frac{1}{4}$ -inch lockwashers.
  - (f) Install front end erecting beam cover (fig. 83) and gasket cover assemblies.
  - (g) Remove the erecting beam support — 9029892 as described in paragraph 36d.
- (5) *Adjustment.* Adjust switch assembly as described in TM 9-1440-250-20.

*e. Forward Locking Wedge Unlock Cable Assembly.* Removal and installation of the forward locking wedge unlock cable assembly (fig. 95) provides for maintenance of the attached switch assembly and connector assemblies. Maintenance procedures are the same as those described in *d* above.

*f. Rear Locking Wedge Lock Cable Assembly.* Removal and installation of the rear locking wedge lock cable assembly (fig. 96) provides for maintenance of the attached switch assembly and box connector assembly.

(1) *Removal.*

- (a) Install the erecting beam support — 9029892 as described in paragraph 36d.
- (b) Remove three gasket cover assemblies (fig. 83).
- (c) Remove beam center cover (fig. 82).
- (d) Remove switch assembly (fig. 96) from erecting beam assembly by removing four hexagon-head screws and lockwashers.

- (e) Remove clamps that secure lock cable assembly to terminal board.
- (f) Attach 14-foot pullthrough-line to terminal end of lock cable assembly as described in paragraph 65a(1)(h) 1 through 4.
- (g) Tie free end of pullthrough line to any convenient part of erecting beam assembly to prevent accidental pullthrough.
- (h) Loosen packing nut on box connector assembly.
- (i) Pull lock cable assembly from erecting beam assembly and remove pullthrough line.

(2) *Installation.*

- (a) Attach the pullthrough line to terminal end of lock cable assembly as described in paragraph 65a(1)(h) 1 through 4.
- (b) Pull lock cable assembly through launcher erecting beam assembly and untie pullthrough line.
- (c) Refer to TM 9-1440-250-35 and make proper wire connections.
- (d) Install clamps that secure lock cable assembly to terminal board group.
- (e) Install box connector assembly and tighten packing nut.
- (f) Install switch assembly with four  $\frac{1}{4}$ -20 x  $2\frac{3}{4}$  hexagon-head screws and  $\frac{1}{4}$ -inch lockwashers.
- (g) Install beam center cover (fig. 82).
- (h) Install three gasket cover assemblies (fig. 83).
- (i) Remove the erecting beam support — 9029892 as described in paragraph 36d.

(3) *Adjustment.* Adjust switch assembly as described in TM 9-1440-250-20.

*g. Rear Locking Wedge Unlock Cable Assembly.* Removal and installation of the rear locking wedge unlock cable assembly (fig. 96) provides for maintenance of the attached switch

assembly and box connector assembly. Maintenance procedures are the same as those described in *f* above.

*h. Front Ajax Rail Lock Cable Assembly.* Removal and installation of the front Ajax rail lock cable assembly (fig. 97) provides for maintenance of the attached switch assembly and connector assembly.

(1) *Removal.*

- (a) Install the erecting beam support—9029892 as described in paragraph 36d.
- (b) Remove gasket cover assemblies (fig. 83) at the front and center.
- (c) Remove clamp (fig. 97) securing cable assembly to terminal board.
- (d) Disconnect connector assembly from bulkhead.
- (e) Remove cable assembly.

(2) *Disassembly.* Disassemble cable assembly.

(3) *Assembly.* Refer to TM 9-1440-250-35, make proper wire connections, and assemble cable assembly.

(4) *Installation.*

- (a) Install switch assembly with four ¼-20 x 2¾ hexagon-head cap screws, ¼-inch flat washers, ¼-inch lockwashers, and ¼-20 hexagon nuts.
- (b) Install connector assembly on cable assembly, secure connector assembly to bulkhead with locknut, and tighten packing nut.
- (c) Install clamp.
- (d) Refer to TM 9-1440-250-35 and make proper wire connections.
- (e) Install gasket cover assemblies (fig. 83).
- (f) Remove the erecting beam support—9029892 as described in paragraph 36d.

*i. Rear Ajax Rail Lock Cable Assembly.* Removal and installation of the rear Ajax rail

lock cable assembly (fig. 98) also provides for maintenance of the attached switch assembly, connector assembly, and the rubber grommet.

(1) *Removal.*

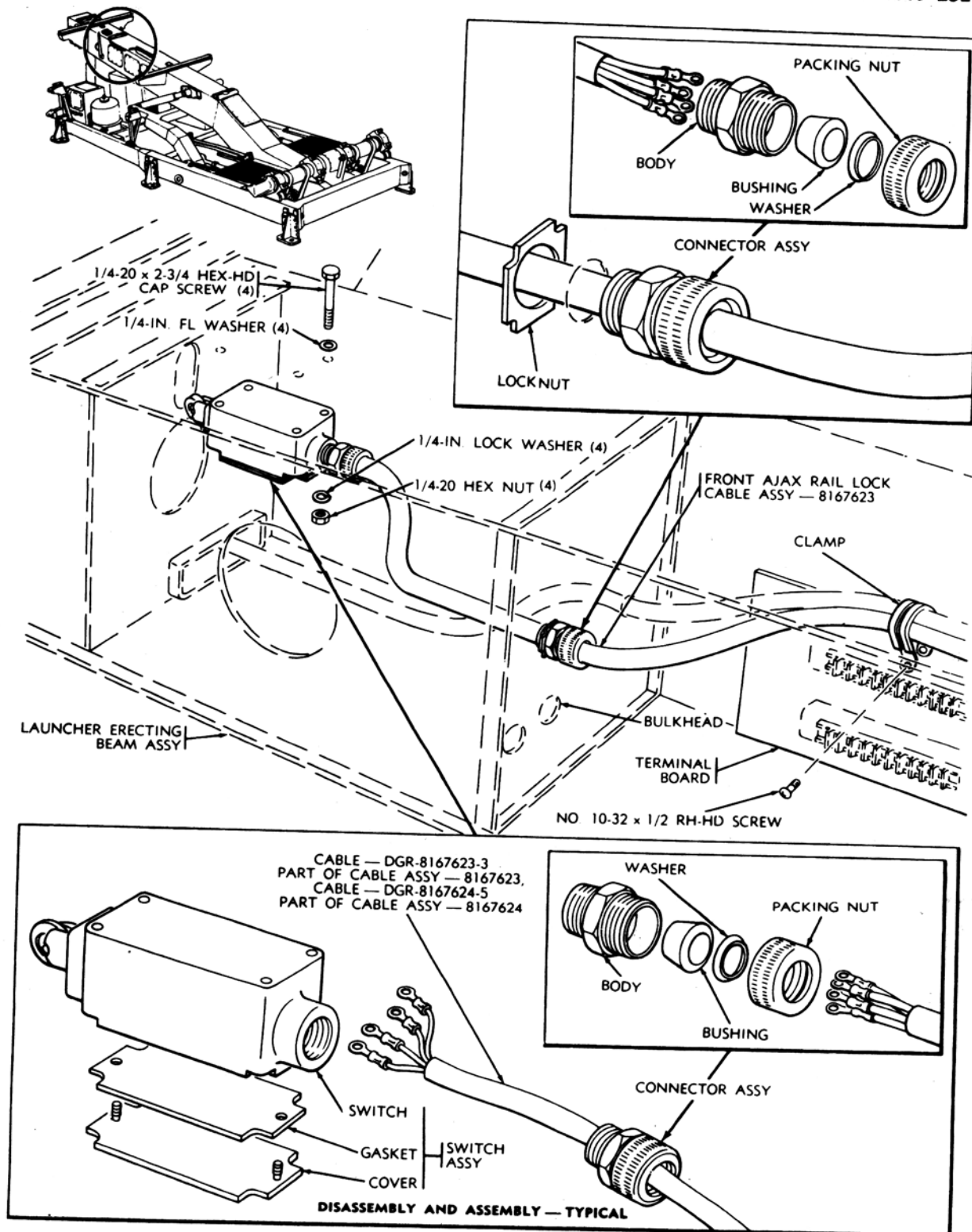
- (a) Install the erecting beam support—9029892 as described in paragraph 36d.
- (b) Remove three gasket cover assemblies (fig. 83).
- (c) Remove three clamps (fig. 96) securing cable assembly to terminal board.
- (d) Remove clamp (fig. 98) securing cable assembly to flange.
- (e) Disconnect connector assembly from front bulkhead.
- (f) Detach switch assembly from erecting beam assembly.
- (g) Pull cable assembly through connector assembly, rubber grommet, hole in rear bulkhead, and out through access hole in left side of erecting beam assembly.
- (h) Remove rubber grommet.

(2) *Disassembly.* Disassemble cable assembly (fig. 97).

(3) *Assembly.* Refer to TM 9-1440-250-35, make proper wire connections, and assemble cable assembly.

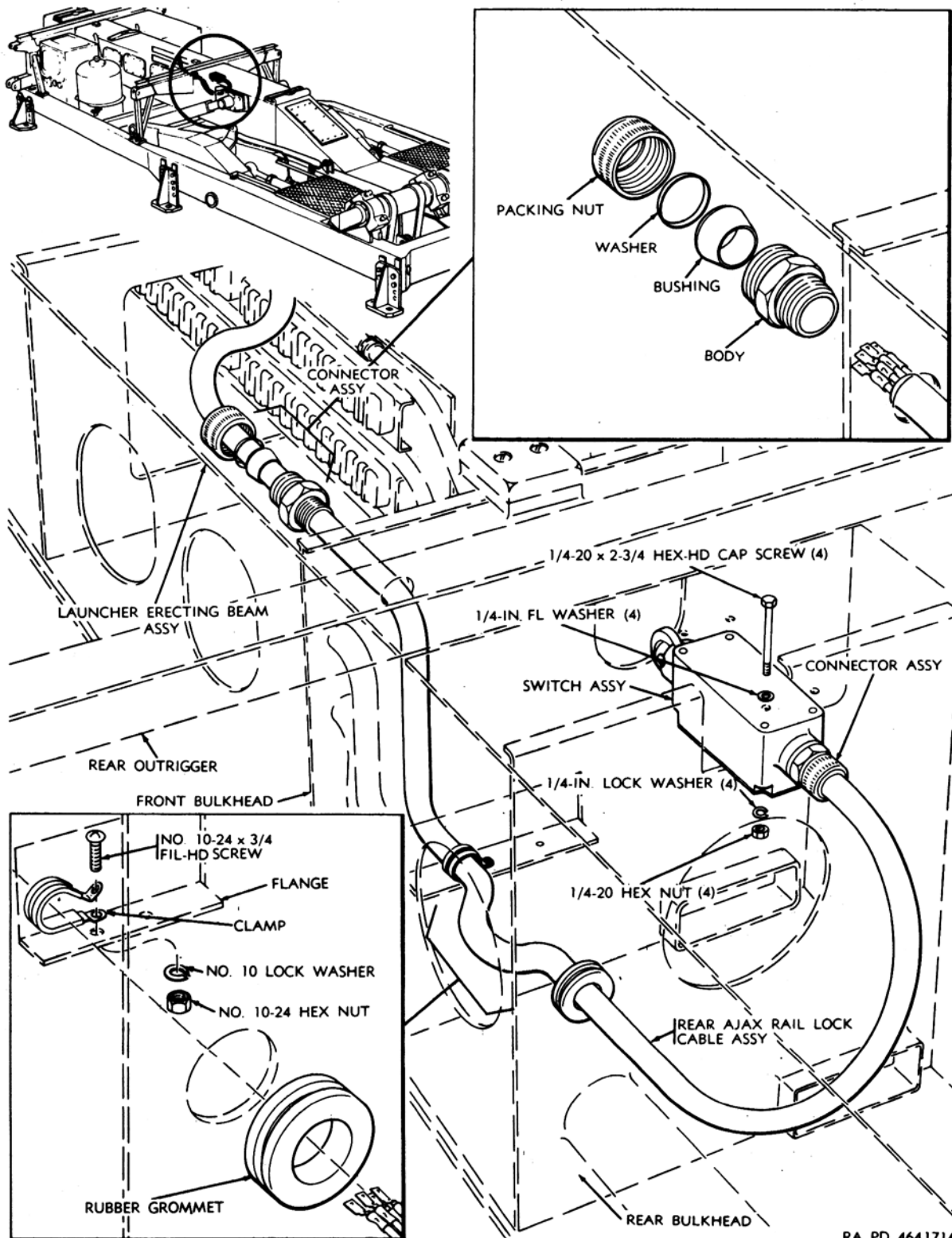
(4) *Installation.*

- (a) Install rubber grommet (fig. 98) in rear bulkhead.
- (b) Position wires of cable assembly through hole at top of rear bulkhead and pull cable assembly down through rubber grommet.
- (c) Install connector assembly and make proper wire connections as described in TM 9-1440-250-35.
- (d) Install switch assembly in beam assembly with four ¼-20 x 2¾ hexagon-head cap screws, ¼-inch flat washers, ¼-inch lockwashers, and ¼-20 hexagon nuts.



RA PD 464170A

Figure 97. Front AJAX rail-lock cable assembly—removal and installation.



RA PD 464171A

**Figure 98. Rear AJAX rail-lock cable assembly—removal and installation.**



- (e) Install clamps (figs. 96 and 98) as required.
- (f) Tighten packing nut (fig. 98) on connector assembly.
- (g) Install three gasket cover assemblies (fig. 83).
- (h) Remove the erecting beam support—9029892 as described in paragraph 36d.

*Figure 99. (Deleted)*

*j. Squib Test Wiring Harness.*

*Note.* The key numbers shown in parentheses in (1) and (2) below refer to figure 100.

(1) *Removal.*

- (a) Install erecting beam support—9029892 as described in paragraph 36d.
- (b) Remove three gasket cover assemblies (fig. 83).

- (c) (Deleted)
  - (d) Remove clamps (fig. 96) securing cable assembly to terminal board.
  - (e) Loosen packing nut (10A).
  - (f) Remove squib test wiring harness (11D or 12H).
- (2) *Installation.*
- (a) Install squib test wiring harness (11D or 12H).
  - (b) Install box connector assembly (10) and tighten packing nut (10A).
  - (c) Install clamps (fig. 96) as required.
  - (d) Refer to TM 9-1440-250-35 and make proper wire connections.
  - (e) Install three gasket cover assemblies (fig. 83).
  - (f) Remove the erecting beam support—9029892 as described in paragraph 36d.

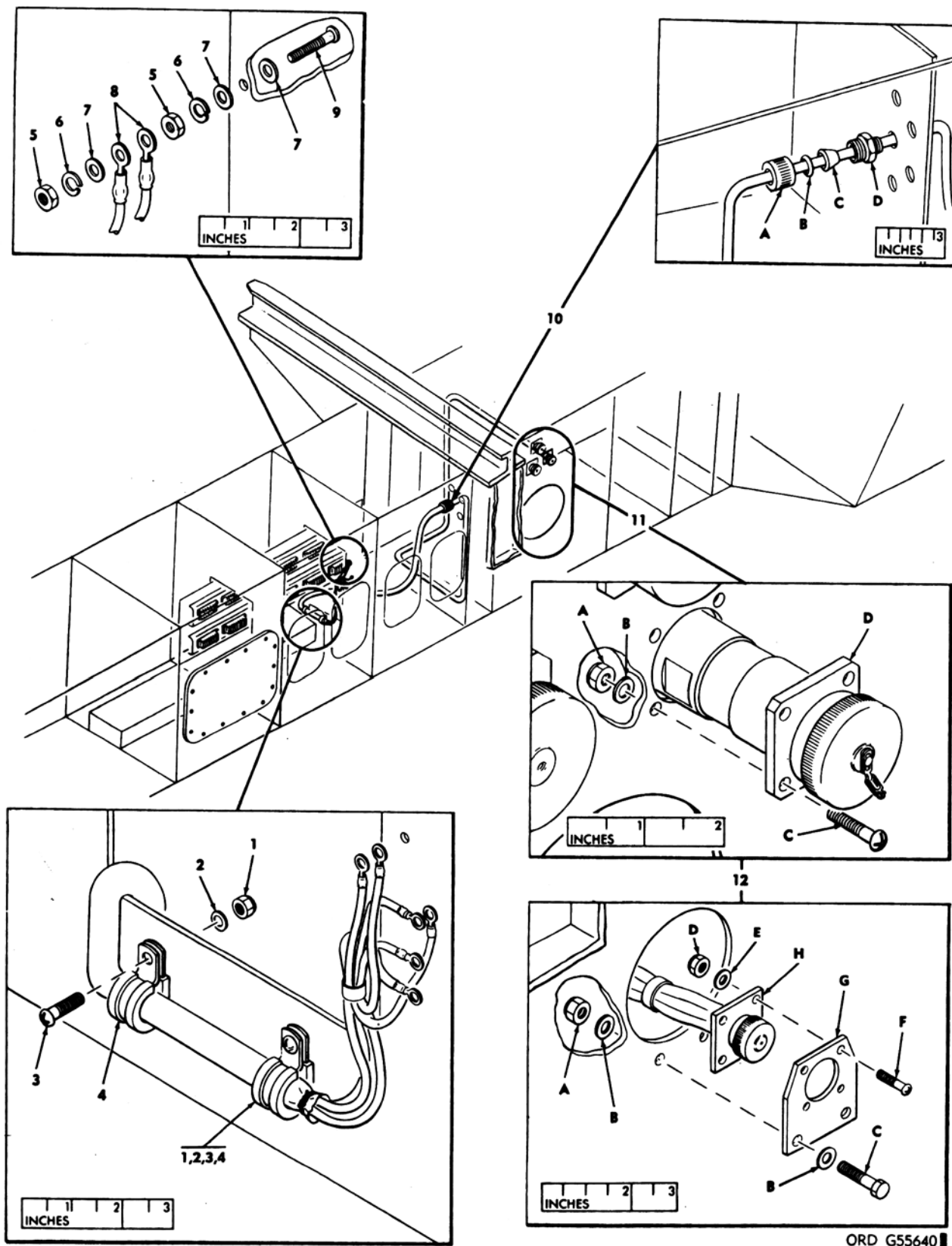
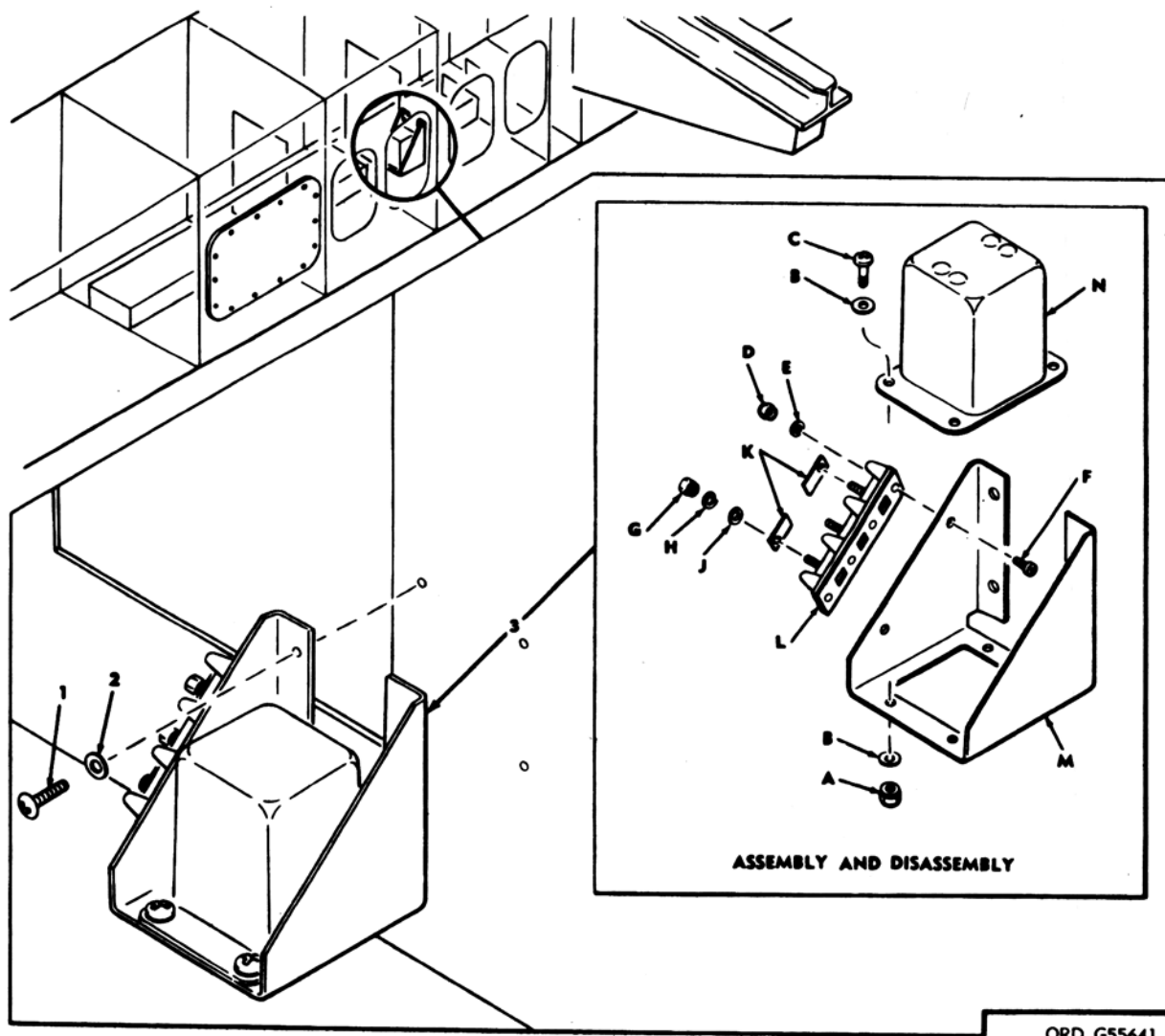


Figure 100. Squib test wiring harness—removal and installation.

- 1—No. 10-32 hexagon nut
- 2—No. 10 flat washer
- 3—No. 10-32 x 3/4 roundhead screw
- 4—Clamp
- 5—No. 6-32 hexagon nut
- 6—No. 6 lockwasher
- 7—No. 6 flat washer
- 8—Ground wire
- 9—No. 6-32 x 7/8 roundhead screw
- 10—Box connector assembly
  - A—Packing nut
  - B—Washer
  - C—Bushing
  - D—Body
- 11—Wiring harness group (3863 and subsequent)
  - A—No. 6-32 hexagon nut (4)
  - B—No. 6 flat washer (4)
  - C—No. 6-32 x 5/8 roundhead screw (4)
  - D—Squib test wiring harness 9022364
- 12—Wiring harness group (1021 through 3862, and 50000 through 50087)
  - A—No. 10-32 hexagon nut (2)
  - B—No. 10 flat washer (2)
  - C—No. 10-32 x 25/32 hexagon-head bolt (2)
  - D—No. 6-32 hexagon nut (4)
  - E—No. 6 flat washer (4)
  - F—No. 6-32 x 1/4 roundhead screw (4)
  - G—Panel
  - H—Squib-test wiring harness 9022364

*Figure 100. Squib-test wiring harness—removal and installation—legend.*





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- 1—No. 10-32 x 5/8 roundhead screw (4) (3863 and subsequent) or no. 10-32 x 21/32 hexagon-head bolt (4) (1021 through 3862)
- 2—No. 10 flat washer (4) (3863 and subsequent or (4) (1021 through 3862)
- 3—Relay bracket assembly
  - A—No. 8-32 hexagon nut (4)
  - B—0.174 id x 3/8 od flat washer (8)
  - C—No 8-32 x 1/2 roundhead screw (4)

- D—No. 4-40 hexagon nut (2)
- E—1/8 id x 5/16 od washer (2)
- F—No. 4-40 x 7/16 panhead screw (2)
- G—No. 6-32 hexagon nut (3)
- H—No. 6 lockwasher (3)
- J—0.149-id x 3/8-od flat washer (3)
- K—Insulator
- L—Terminal board
- M—Bracket
- N—Relay

Figure 100.1. Relay bracket assembly—removal and installation.

#### j.1. Relay Bracket Assembly.

##### (1) Removal.

- (a) Install the erecting beam support-9029892 as described in paragraph 36d.
- (b) Remove cover assembly gaskets (fig. 83).

##### (c) Remove relay bracket assembly (3, fig. 100.1).

- (2) *Disassembly.* Disassemble relay bracket assembly (3, fig. 100.1).
- (3) *Assembly.* Assemble relay bracket assembly (3, fig. 100.1).
- (4) *Installation.*

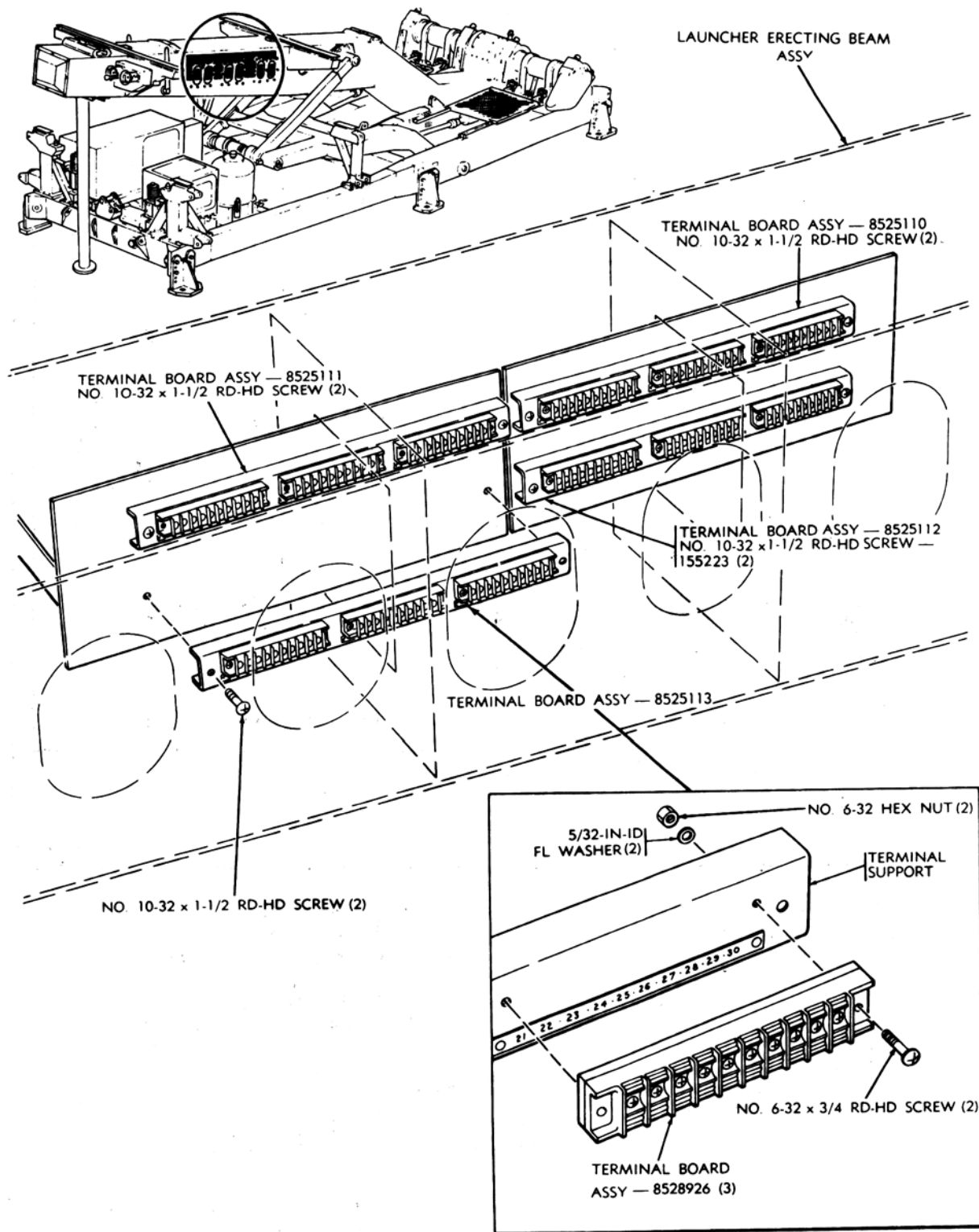


Figure 101. Terminal board assembly—removal and installation.



- (a) Install the relay bracket assembly (3, fig. 100.1).
- (b) Install the cover assembly gaskets (fig. 83).
- (c) Remove the erecting beam support as described in paragraph 36d.

**k. Terminal Board Assembly.**

**(1) Removal.**

- (a) Install the erecting beam support as described in paragraph 36d.
- (b) Remove the three gasket cover assemblies (fig. 83).
- (c) Disconnect the cable assemblies from the terminal board assembly (fig. 101) to be replaced.
- (d) Remove the terminal board assembly.

**(2) Disassembly.** Disassemble the terminal board assembly.

**(3) Assembly.** Assemble the terminal board assembly.

**(4) Installation.**

- (a) Install the terminal board assembly.
- (b) Refer to TM 9-1440-250-35/1 and make the proper wire connections.
- (c) Install the three gasket cover assemblies (fig. 83).
- (d) Remove the erecting beam support as described in paragraph 36d.

**67. Hydraulic Pumping Unit Electrical Components**

The hydraulic pumping unit electrical components are the valve cable assembly (13, fig. 102), motor cable assembly (16), and ac motor (24).

**a. Valve Cable Assembly.**

**(1) Removal.**

- (a) Remove the hydraulic unit door assembly (fig. 123), ventilatory cover assembly, and access cover assembly.
- (b) Disconnect the wiring harness assembly (Z, fig. 122) from receptacle J85B on the hydraulic pumping unit.

- (c) Disconnect the connectors of the valve cable assembly (13, fig. 102) from the locking wedge solenoid valve (1), the up-down solenoid valve (2), and the missile hydraulic solenoid valve (3).

- (d) Disconnect the valve cable assembly from the side of the hydraulic pumping unit (4).

- (e) Remove the four clamps (7 and 10) securing the valve cable assembly to the hydraulic pumping unit.

**(2) Installation.**

- (a) Position the valve cable assembly in the hydraulic pumping unit.

- (b) Secure the valve cable assembly to the hydraulic pumping unit with the clamp (7).

- (c) Secure the valve cable assembly with the clamps (10).

- (c.1) Apply class B sealant EC1608 (9020050) or equivalent between the receptacle of the valve cable assembly and the side of the hydraulic pumping unit as prescribed in TM 9-1400-250-15/3.

- (d) Secure the receptacle of the valve cable assembly to the side of the hydraulic pumping unit.

- (e) Connect the plug connectors of the valve cable assembly to the locking wedge solenoid valve, the up-down solenoid valve, and the missile hydraulic solenoid valve.

- (f) Connect the wiring harness assembly (Z, fig. 122) to receptacle connector J85B of the hydraulic pumping unit.

- (g) Install the hydraulic unit door assembly (fig. 123), the ventilatory cover assembly, and the access cover assembly.

**b. Motor Cable Assembly.**

**(1) Removal.**

- (a) Remove the hydraulic unit door assembly (fig. 123), the ventilatory cover assembly, and the access cover assembly.

- (b) Disconnect the cable assembly (AA, fig. 122) from the receptacle connec-

tor J71A on the hydraulic pumping unit.

- (c) Remove the plug connector of the motor cable assembly (16, fig. 102) from the ac motor (24).
- (d) Disconnect the motor cable assembly from the side of the hydraulic pumping unit (4).
- (e) Remove the two clamps (19).
- (f) Remove the motor cable assembly from the hydraulic pumping unit.
- (2) *Installation.*
  - (a) Position the motor cable assembly in the hydraulic pumping unit.
  - (b) Secure the motor cable assembly to the side and the top of the hydraulic pumping unit with the two clamps (19).
  - (b.1) Apply class B sealant EC1608 (9020050) or equivalent between the receptacle of the motor cable assembly and the side of the hydraulic pumping unit (4) as prescribed in TM 9-1400 250-15/3.
  - (c) Secure the receptacle of the motor cable assembly to the side of the hydraulic pumping unit.
  - (d) Connect the plug connector of the motor cable assembly to the receptacle connector of the ac motor.
  - (e) Connect the cable assembly (AA, fig. 122) to the receptacle connector J71A of the hydraulic pumping unit.
  - (f) Install the hydraulic unit door assembly (fig. 123), the ventilatory cover assembly, and the access cover assembly.

### c. AC Motor.

#### (1) *Removal.*

- (a) Install the erecting beam support as described in paragraph 36d.
- (b) Remove the hydraulic unit door assembly (fig. 123), the ventilatory cover assembly, and the access cover assembly.
- (c) Disconnect the plug connector of the motor cable assembly (16, fig. 102) from the ac motor (24).
- (d) Remove the ac motor from the axial pistons pump (21).

#### (2) *Partial disassembly and inspection.*

*Note.* The inspection and servicing described in (a) through (d), and (3) below must be performed after every 170 hours of motor assembly operation or at biennial maintenance, whichever occurs first. On motors without lubrication fittings, only a check for proper servicing with the specified lubricant is necessary when installing a new motor assembly.

- (a) Remove the end bell and the motor rotating group.

*Note.* If flat washers are present in (a) above, remove and retain.

- (b) Remove the gear case group.
- (c) Remove the lubricant and clean the interior of the gear case group and gear shaft.
- (d) Inspect the gear shaft and the ball bearing for excessive wear, damage, or roughness.

**Caution:** Do not attempt to lubricate the ball bearing.

*Note.* Any ball bearing noise or roughness, or an excessively worn gear shaft shall be cause for rejection of the motor assembly.

- 1—Locking wedge solenoid valve
- 2—Up-down solenoid valve
- 3—Missile hyd solenoid valve
- 4—Hydraulic pumping unit
- 5—No. 8-32 hex. nut
- 6—No. 8-32 x  $\frac{1}{2}$  pan-hd screw
- 7—Clamp 8131950
- 8—No. 8-32 hex. nut
- 9—No. 8-32 x  $\frac{1}{2}$  pan-head screw
- 10—Clamp 8177005 (3)
- 11—No. 8-32 hex. nut (4)
- 12—No. 8-32 x  $\frac{5}{8}$  rd-hd screw (4)
- 13—Valve cable assy
- 14—No. 10-32 hex. nut (4)

- 15—No. 10-32 x  $\frac{5}{8}$  rd-hd screw (4)
- 16—Motor cable assy
- 17—No. 10-32 hex. nut
- 18—No. 10-32 x  $\frac{5}{8}$  rd-hd screw
- 19—Clamp 8168638
- 20— $\frac{3}{4}$ -24 hex. nut (6)
- 21—Axial pistons pump
- 22— $\frac{1}{4}$ -20 hex. nut (4)
- 23— $\frac{1}{4}$ -20 x  $1\frac{1}{4}$  hex-hd screw (4)
- 24—AC motor
- 25— $\frac{1}{8}$ -27 pressure relief fitting<sup>1</sup>
- 26— $\frac{1}{8}$ -27 lubrication fitting<sup>1</sup>

<sup>1</sup>On motors modified by direct support only.

Figure 102. Hydraulic pumping unit ac motor and cable assemblies — removal and installation — legend.



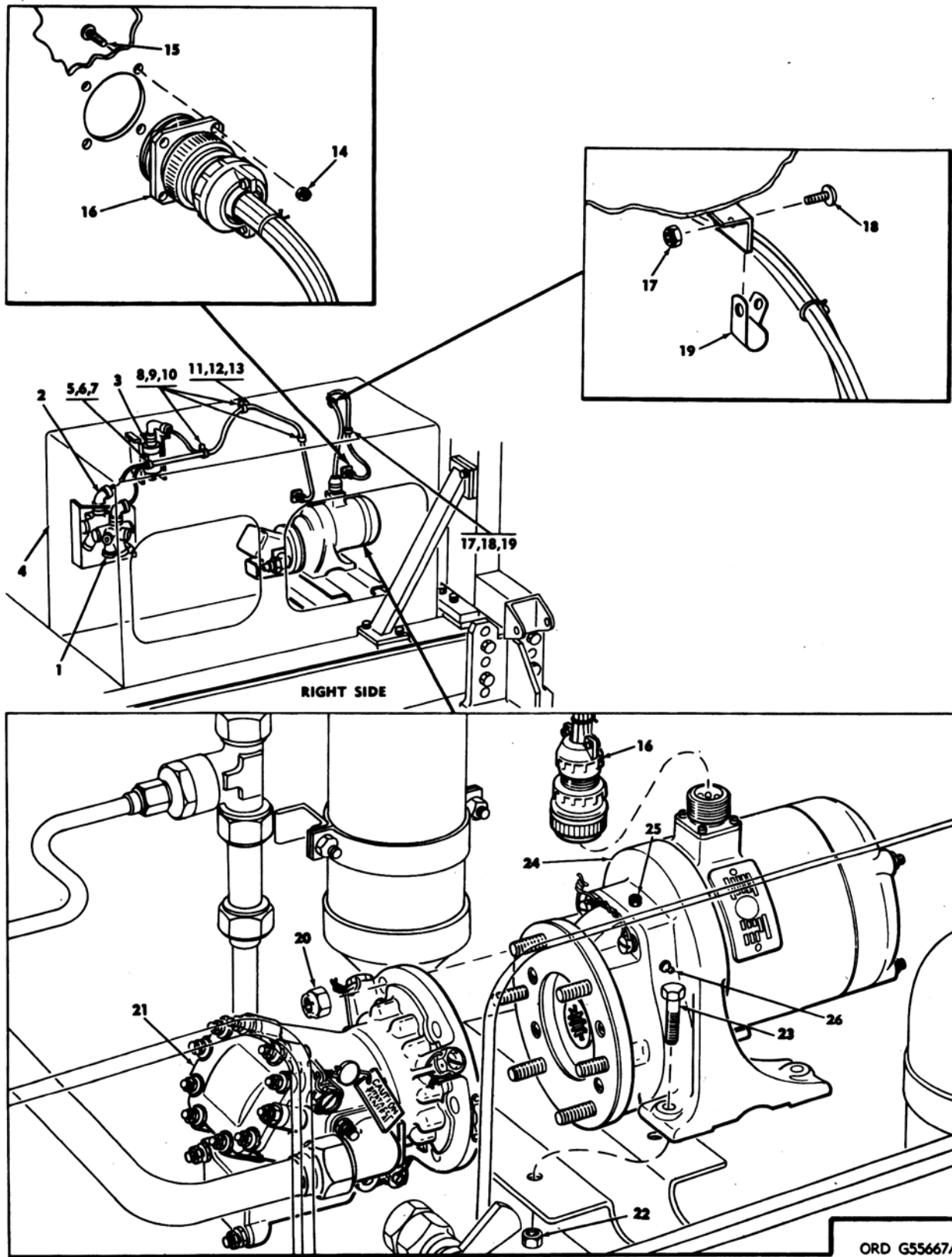


Figure 102. Hydraulic pumping ac motor and cable assemblies — removal and installation.



Figure 100. Schematic diagram of pump and motor assembly.

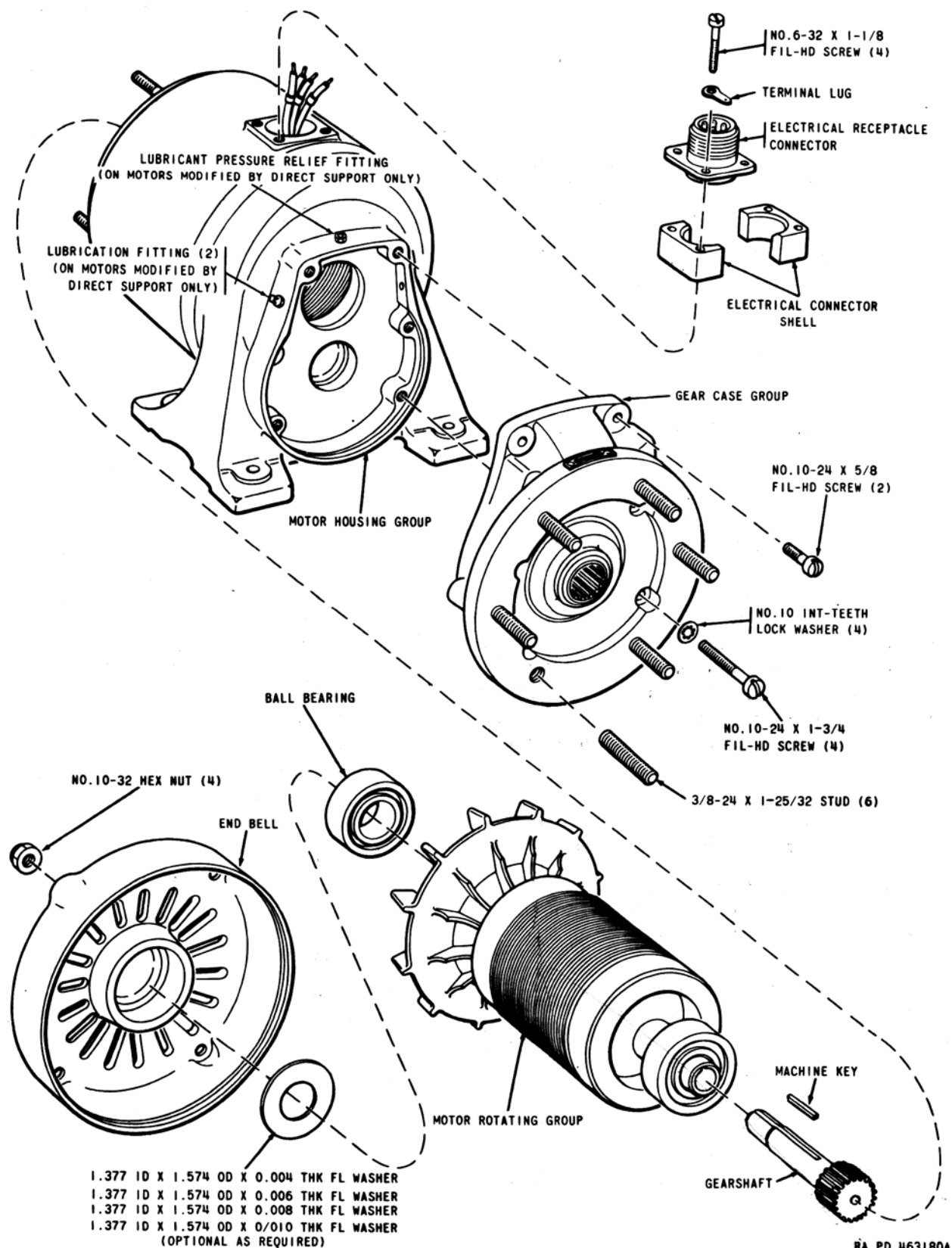


Figure 103. AC motor assembly — partial disassembly and assembly.

(3) *Assembly.*

- (a) Install the end bell and the motor rotating group in the motor housing group.

*Note.* Reinstall exactly the same flat washers between the ball bearing and end bell as were removed. If they require replacing, replace them with flat washers of exactly the same size.

- (b) Fill the gear case group as specified in LO 9-1400-250-20.

- (c) Install the gear case group.

(4) *Installation.*

- (a) Engage the ac motor (24) and the spline of the axial pistons pump (21), and secure the pump to the motor.

- (b) Install the motor.

- (c) Connect the motor cable assembly (16) to the motor.

- (d) Install the hydraulic unit door assembly (fig. 123), the ventilatory cover assembly, and the access cover assembly.

- (e) Remove the erecting beam support as described in paragraph 36d.

## Section IV. MAINTENANCE OF THE LAUNCHER ERECTING BEAM ASSEMBLY

### 68. General

This section covers maintenance of the NIKE-AJAX launching and handling rail lock switch linkage, the erecting beam hook and switch trip latch, the erecting indexing pin and link index, the gasket cover assemblies, the forward and rear wedge groups with locking wedge adjusters, and the two locking wedge hydraulic cylinders. The general precautions prescribed in paragraph 58 must be observed when any maintenance is performed on the launcher erecting beam assembly.

### 69. NIKE-AJAX Launching and Handling Rail Lock Switch Linkage (fig. 104)

Linkages for the two rail lock switches are located inside the launcher erecting beam assembly at the rear of each T-track.

*Note.* In mobile installations, a jumper wire allows the launcher erecting beam to be raised during deflector emplacement without a launching-handling rail on the launcher. Remove the jumper wire in accordance with TM 9-1440-250-12/2 prior to elevating a NIKE-AJAX launching and handling rail.

#### a. Removal.

- (1) Install the erecting beam support as described in paragraph 36d.
- (2) Disconnect and remove the spring.

- (3) Remove the two flat-head screws and external-teeth lockwashers securing the switch linkage to the beam assembly.

- (4) Remove the switch linkage.

#### b. Disassembly. Disassemble the switch linkage.

#### c. Assembly. Assemble the switch linkage.

#### d. Installation.

- (1) Position the switch linkage inside the beam assembly and insert the eye bolt through the hole in the T-track.
- (2) Install the switch linkage.
- (3) Connect the spring.
- (4) Remove the erecting beam support as described in paragraph 36d.

### 70. Erecting Beam Hook and Switch Trip Latch (fig. 105)

The erecting beam hook and switch trip latch are installed at the front and underneath the launcher erecting beam assembly.

#### a. Removal.

- (1) Install the erecting beam support as described in paragraph 36d.
- (2) Remove the beam hook and the trip latch.

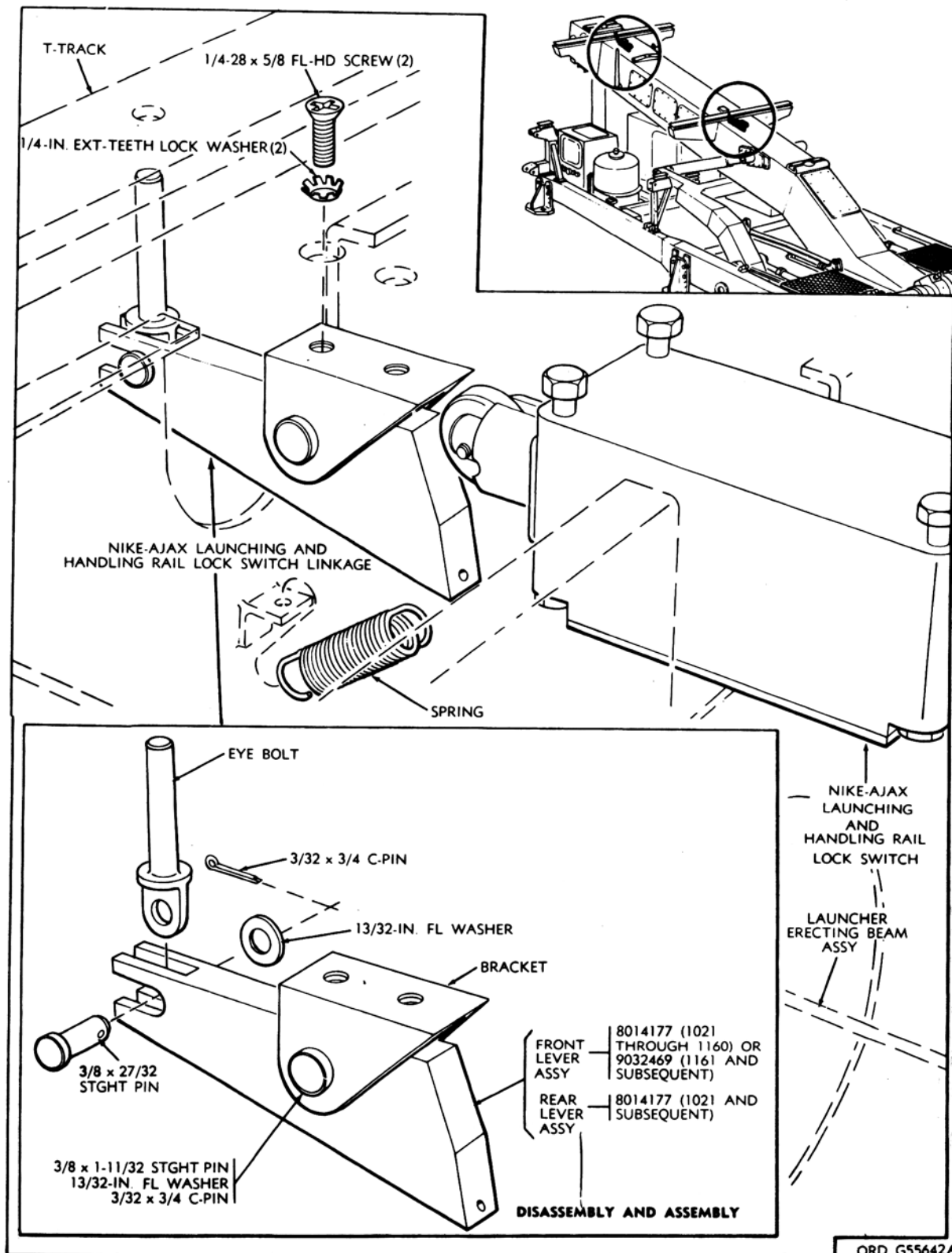
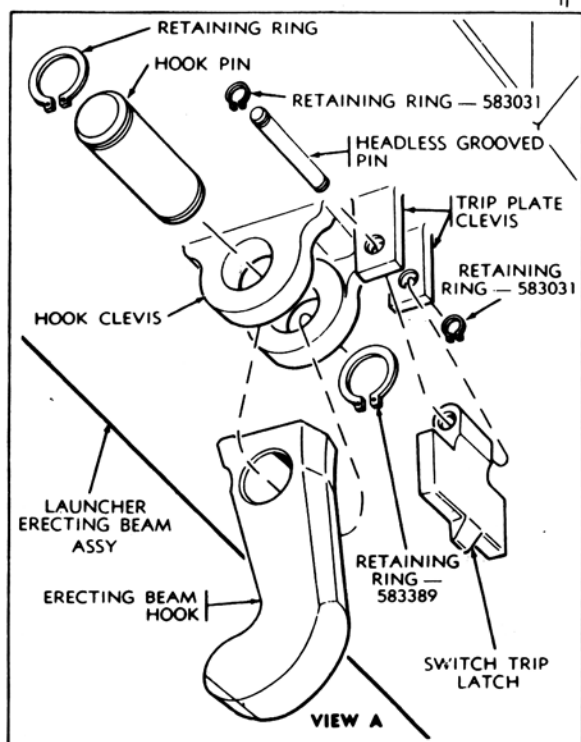
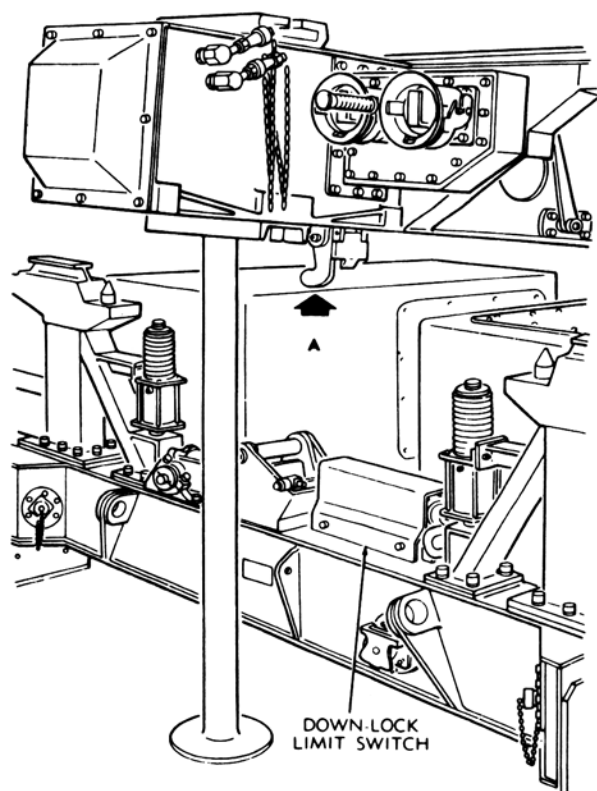


Figure 104. NIKE-AJAX launching and handling rail-lock-switch linkage—removal and installation—typical.



RA PD 463115 A

Figure 105. Erecting beam hook and switch trip latch—removal and installation.

#### b. Installation.

- (1) Install erecting beam hook inside hook clevis with curved end to the right.
- (2) Install switch trip latch on trip plate clevis with the slanted surface towards down-lock limit switch.
- (3) Test hook and latch for freedom of movement.
- (4) Adjust limit switch, if necessary, as described in TM 9-1440-250-20/1.
- (5) Remove the erecting beam support-9029892 as described in paragraph 36d.

### 71. Erecting Indexing Pin and Link Index

The erecting indexing pin (fig. 106) and link index are located inside the launcher erecting beam assembly at the rear of the front outriggers.

#### a. Removal.

- (1) Install the erecting beam support-9029892 as described in paragraph 36d.
- (2) Remove the erecting indexing pin and link index.

#### b. Installation.

- (1) Assemble helical compression spring on erecting indexing pin and insert pin through top of launcher erecting beam assembly.
- (2) Install link index.
- (3) Check pin and link index for freedom of movement and proper operation.
- (4) Remove the erecting beam support-9029892 as described in paragraph 36d.

### 72. Gasket Cover Assembly

Three gasket cover assemblies (fig. 107), providing access inside the launcher erecting beam assembly, are located on the left side of the beam assembly.

#### a. Removal.

- (1) Install the erecting beam support-9029892 as described in paragraph 36d.
- (2) Remove gasket cover assembly.

b. Disassembly. Remove gasket from cover plate.

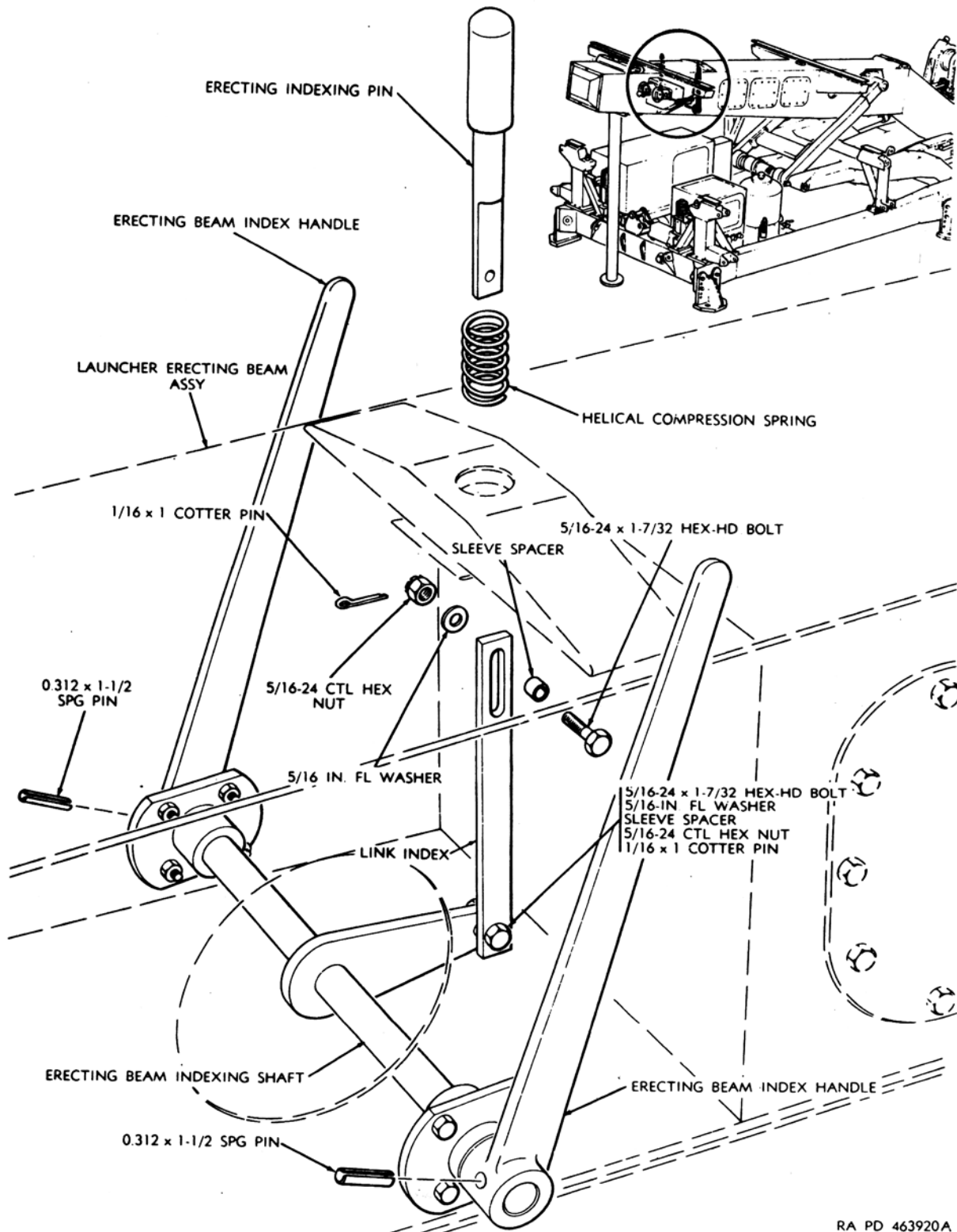


Figure 106. Erecting indexing pin and link index—removal and installation.



c. *Assembly.* Cement synthetic rubber and cork gasket on cover plate as described in paragraph 36b.

d. *Installation.*

- (1) Install gasket cover assembly.
- (2) Remove erecting beam support 90298-92 as described in paragraph 36d.

### 73. Forward Locking Wedge Group and Locking Wedge Adjuster Assembly

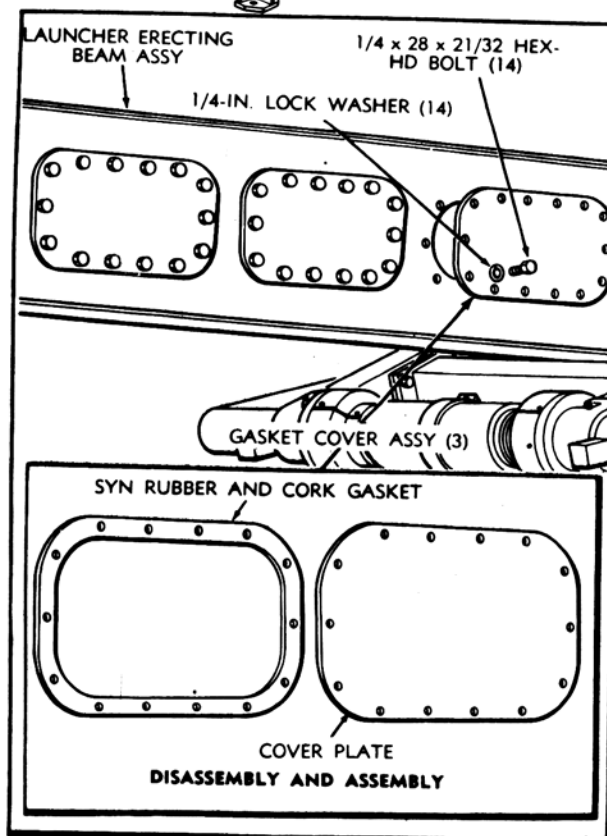
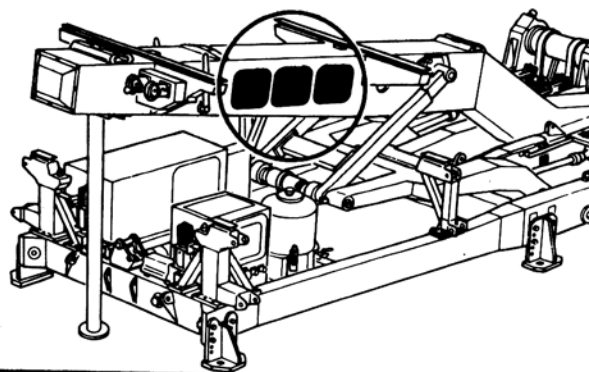
The forward locking wedge group and locking wedge adjuster assembly (fig. 108) are located in the front of the launcher erecting beam assembly.

*Note.* The key numbers shown in parentheses in a below refer to figure 108 unless otherwise indicated.

a. *Removal.*

- (1) Remove three access cover plates (view A, fig. 180) and front end cover from launcher erecting beam assembly (10).
- (2) Open EQUILIBRATOR SYSTEM BY-PASS valve (fig. 60) and SYSTEM BY-PASS valve.
- (3) Depressurize hydraulic oil reservoir by turning handle of plug cock to VENT position and holding until all pressure is discharged.
- (4) Disconnect tube assembly (1) from rear of forward locking wedge group (11) and cap exposed line.
- (5) Disconnect tube assembly (2.1) from tee group (2). Remove tee group (2) from tube nipple (3). Cap exposed line.
- (6) Remove tube nipple (3) and preformed packing (4). Discard preformed packing.
- (7) Remove one of the four flat-head screws (12A) from the locking wedge adjuster assembly (12) and replace it with a hexagon-head bolt (5). Use this long bolt as a handle to hold and prevent the locking wedge adjuster assembly (12) from falling and becoming damaged when the forward locking wedge group (11) is removed.
- (8) Remove six hexagon-head cap screws (6 and 8) securing the forward locking wedge group (11) to the launcher erecting beam assembly (10).

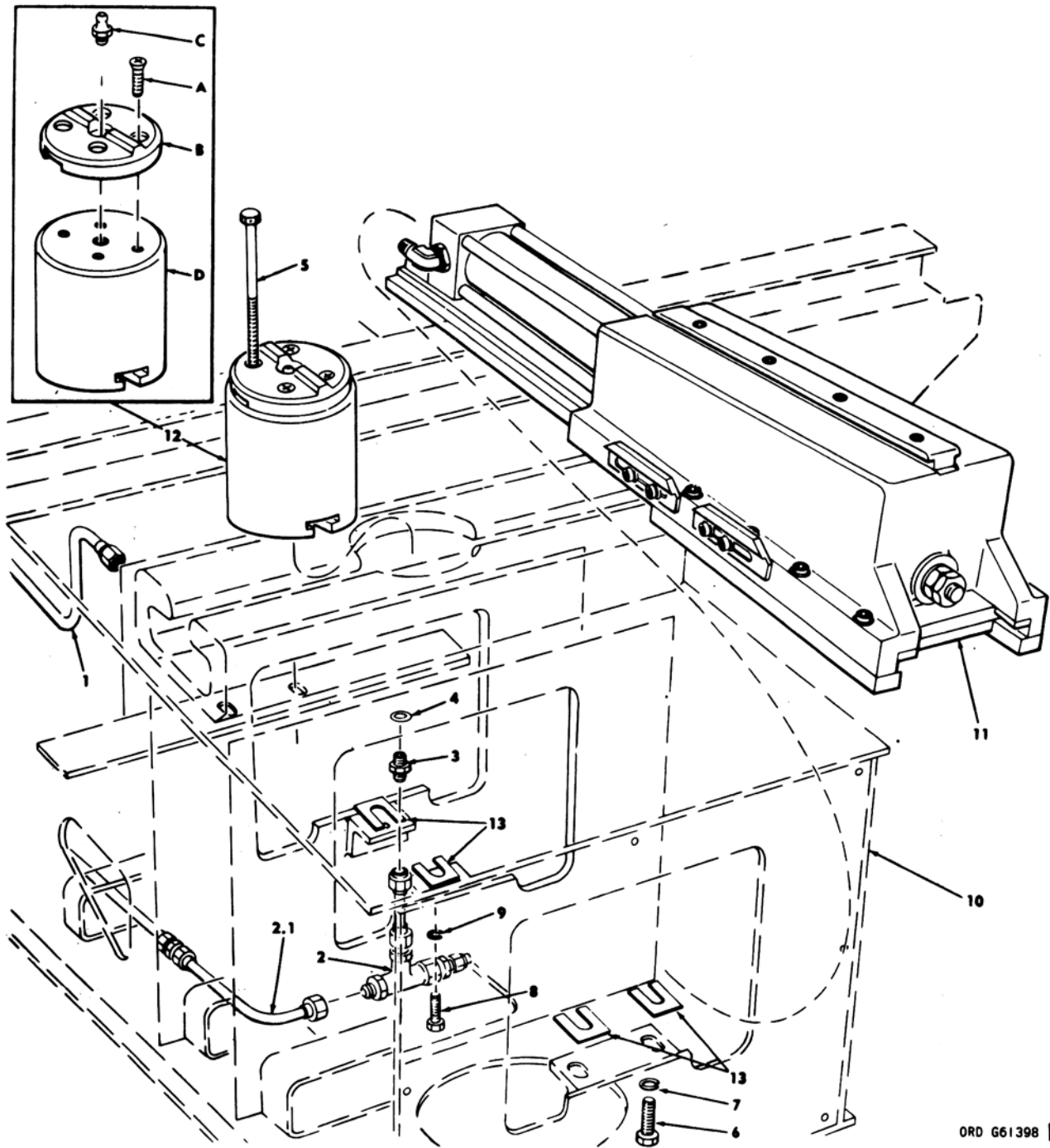
- (9) Remove forward locking wedge group (11) by moving wedge group (11) forward until it slides free of locking wedge adjuster assembly (12).
- (10) Remove locking wedge adjuster assembly (12).
- (11) Remove wedge group (11) from beam assembly (10).



ORD G55643A

Figure 107. Removal and installation of the gasket cover assembly.

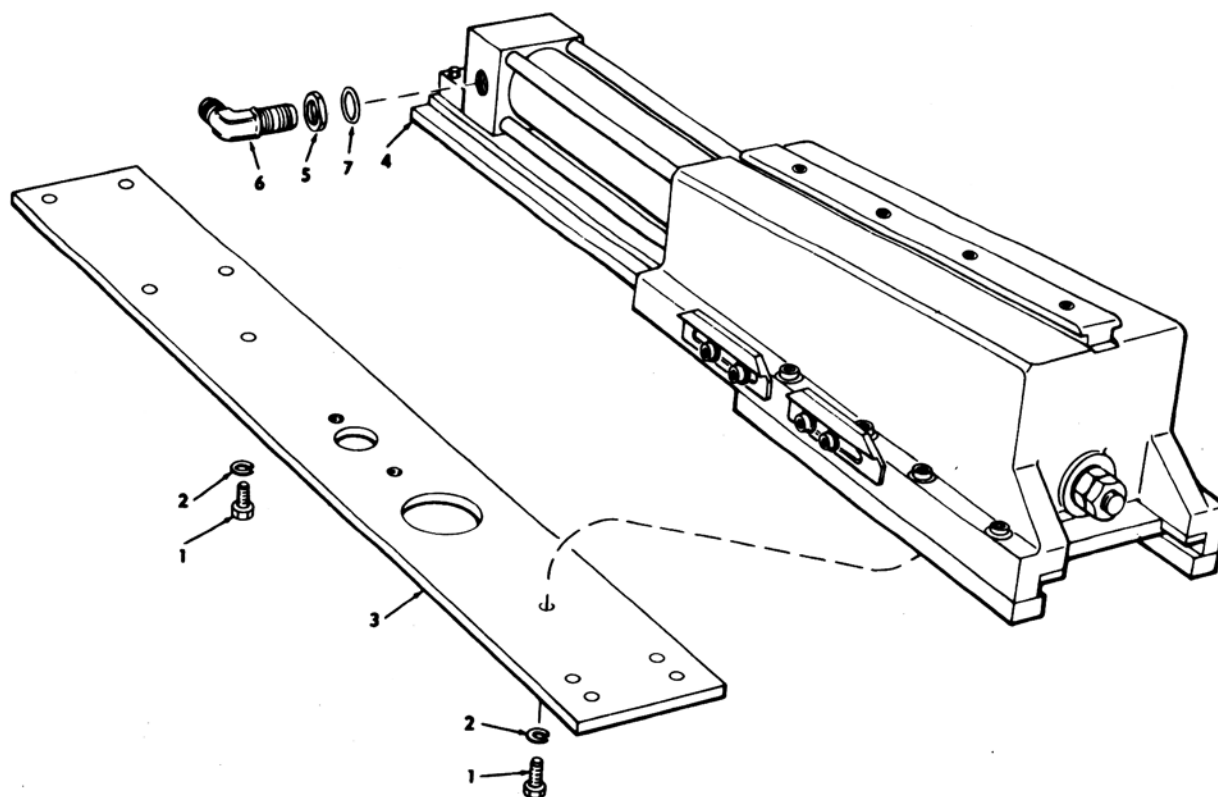




ORD 661398

- |   |   |
|---|---|
| 1 — Tube assy 9977629   | 8 — $\frac{3}{8}$ -24 x $\frac{1}{16}$ hex-hd cap screw (2) |
| 2 — Tee group   | 9 — $\frac{3}{8}$ -in. lockwasher (2)                       |
| 2.1 — Tube assy 9977628   | 10 — Launcher erecting beam assy                            |
| 3 — $\frac{1}{2}$ tube nipple   | 11 — Forward locking wedge group                            |
| 4 — Preformed packing   | 12 — Locking wedge adjuster assy                            |
| 5 — $\frac{1}{4}$ -20 hex-hd bolt (used only during removal or installation of locking wedge adjuster assembly) | A — $\frac{1}{4}$ -20 x $\frac{3}{4}$ fl-hd screw (4)       |
| 6 — $\frac{3}{8}$ -24 x $\frac{1}{4}$ hex-hd cap screw (4)  | B — Hydraulic locking wedge                                 |
| 7 — $\frac{3}{8}$ -in. lockwasher (4)   | C — $\frac{1}{4}$ -in. lubrication fitting                  |
|   | D — Hydraulic ram   |
|   | 13 — Shim   |

Figure 108. Removal and installation of the forward locking wedge group and locking wedge adjuster assembly.



ORD G55645

- 1 —  $\frac{3}{8}$ -24 x  $\frac{1}{4}$  hex-hd bolt  
 2 —  $\frac{3}{8}$ -in. lockwasher  
 3 — Erecting beam locking wedge base  
 4 — Locking wedge assy 8167295 (1021 through

- 1252) or 9032529 (1253 and subsequent)  
 5 —  $\frac{1}{16}$ -18 hex. nut  
 6 —  $\frac{1}{16}$ -tube elbow 90°  
 7 — Preformed packing

Figure 109. Disassembly and assembly of the forward locking wedge group.

*Note.* On launcher units 1253 and subsequent, shims (13) are installed, as required, beneath the wedge group (11). These shims are to be installed in their same position upon installation of the wedge group in d below.

- (12) Remove the shims (13).

**b. Disassembly.**

- (1) Remove the erecting beam locking wedge base (3, fig. 109) from the locking wedge assembly (4).
- (2) Remove the tube elbow (6) from the locking wedge assembly.

*Note.* Rotate the actuating shaft until the machined flat will receive the setscrew, tighten the flat-point setscrew (1, fig. 110) to prevent rotation of the actuating shaft (4) while performing step (3) below.

- (3) Disconnect the locking wedge hydraulic cylinder group (6, fig. 110) from the locking wedge (5).
- (4) Loosen the setscrew (1) and remove the locking wedge hydraulic cylinder group (6).

- (5) Disassemble the locking wedge (fig. 111) as required.

- (6) Remove the plate (4, fig. 112) from the locking wedge hydraulic cylinder assembly (3).

- (7) Disassemble the cylinder assembly (fig. 113) as required.

**c. Assembly.**

- (1) Assemble the locking wedge hydraulic cylinder assembly (3, fig. 112).

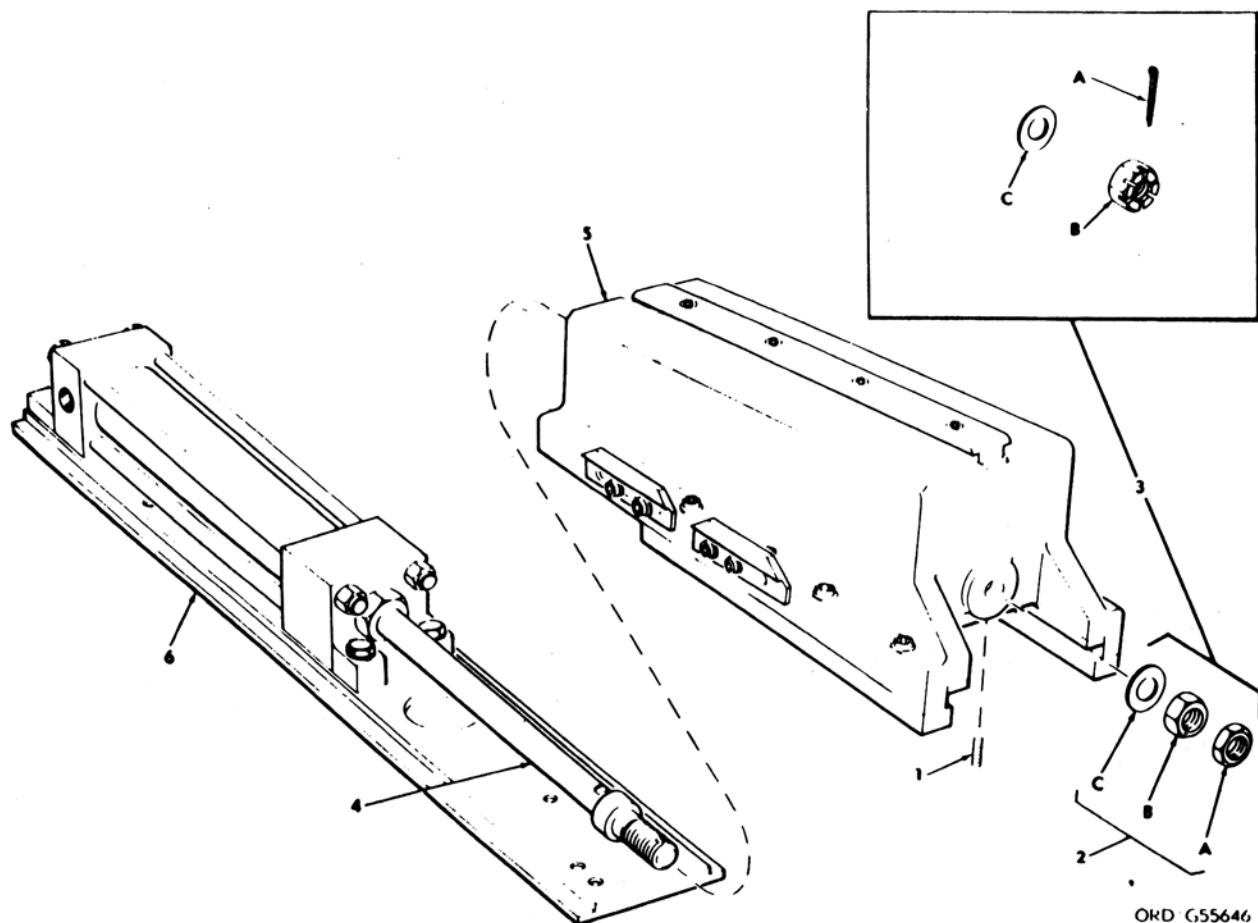
- (2) Test the cylinder assembly using hydraulic test stand 8523711 (fig. 49) in conjunction with TM 9-4935-254-15.

- (3) Install the plate (4, fig. 112) on the locking wedge hydraulic cylinder assembly (3).

- (3.1) Secure the cap screws with steel lock wire.

- (4) Assemble the wedge assembly (fig. 111).

- (5) Assemble the locking wedge (5, fig. 110) and the locking wedge hydraulic cylinder group (6).



ORD G55646

- |   |   |
|---|---|
| 1 — No. 10-32 x $\frac{3}{4}$ flat-point setscrew | A — $\frac{1}{8}$ x $1\frac{1}{2}$ cotter pin |
| 2 — Nut and washer group (1253 and subsequent)    | B — $\frac{5}{16}$ -18 hex. nut               |
| A — $\frac{5}{16}$ -18 hex. nut                   | C — $\frac{1}{16}$ -in fl washer              |
| B — $\frac{5}{16}$ -18 hex. nut                   | 4 — Actuating shaft                           |
| C — $\frac{1}{16}$ -in fl washer                  | 5 — Locking wedge                             |
| 3 — Nut and washer group (1021 through 1252)      | 6 — Locking wedge hydraulic cylinder group    |

Figure 110. Disassembly and assembly of locking wedge assembly.

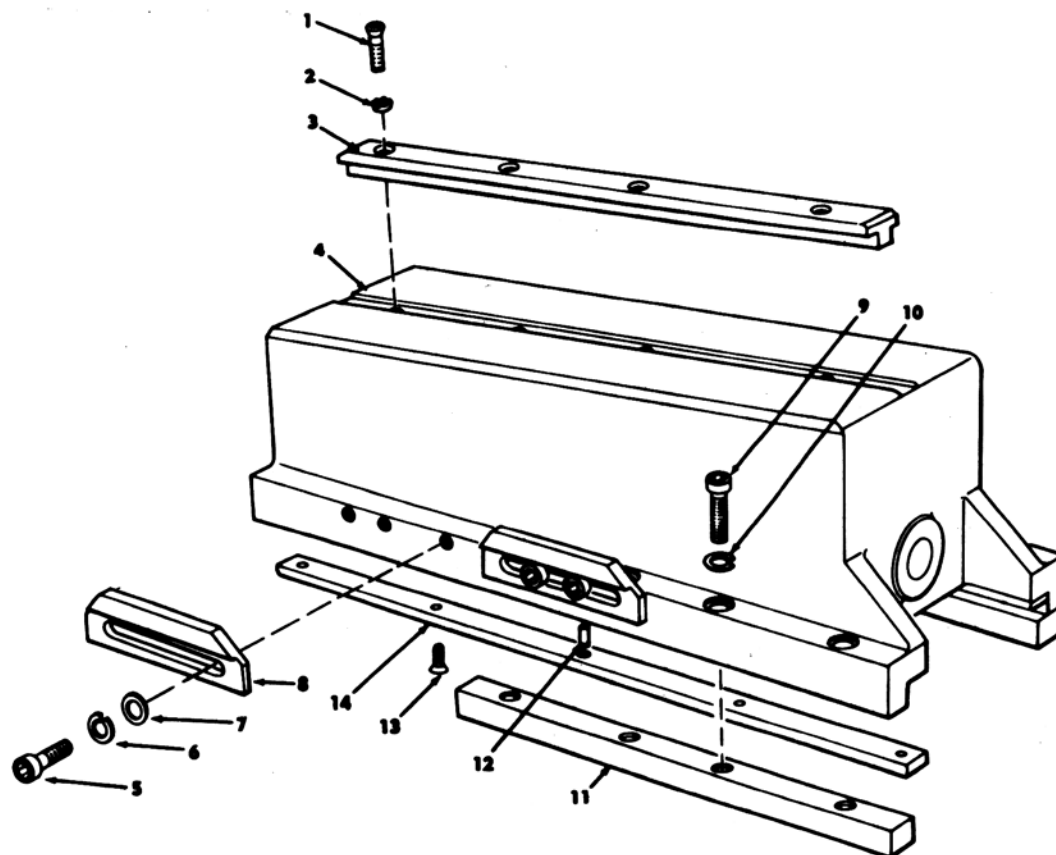
**Note.** Rotate the actuating shaft until the machined flat will receive the flat-point setscrew (1, fig. 110). Tighten the setscrew to prevent the actuating shaft from rotating while securing the locking wedge (5) to the actuating shaft; loosen the setscrew after the locking wedge and the locking wedge hydraulic cylinder group (6) have been assembled.

- (6) Assemble the erecting beam locking wedge base (3, fig. 109) and the locking wedge assembly (4).
- (7) Install the new preformed packing (7), and the tube elbow (6) on

the locking wedge assembly.

#### d. Installation.

- (1) Install the hexagon-head bolt (5, fig. 108) in the locking wedge adjuster assembly (12), and position the adjuster assembly in the launcher erecting beam assembly (10).
- (1.1) Position the forward locking wedge group (11) in the forward end of the erecting beam assembly, and align the key slot in the lower portion of the adjuster assembly with the erecting beam locking key (3, fig. 111)



ORD G55647

- 1—1/4-20 x 1 internal-wrenching screw (4)
- 2—1/4-inch lockwasher
- 3—Erecting beam locking key
- 4—Erecting beam locking wedge
- 5—1/4-20 x 7/8 socket-head cap screw (2)
- 6—1/4-inch lockwasher (2)
- 7—1/4-inch flat washer (2)
- 8—Erecting beam wedge cam (2)
- 9—5/16-18 x 1 1/2 socket-head cap screw (8)

- 10—5/16-inch lockwasher (8)
- 11—Locking wedge gasket 9032654 (2) (1253 and subsequent) or 9019222 (2) (1021 through 1059) or 8167294 (2) (1060 through 1252)
- 12—0.2502 x 5/8 headless straight pin 589920 (2) (1021 through 1059 and 1253 and subsequent)
- 13—No. 10-32 x 5/8 fl-hd screw (8)
- 14—Base plate (2)

Figure 111. Disassembly and assembly of the locking wedge.

of the locking wedge assembly (4, fig. 109).

*Note.* The purpose of the shim is to level the wedge lock assembly as required to permit proper operation of the plug assembly. Shims are not necessarily used in all wedge-lock installations, nor are they applicable to any particular serial-numbered group of launchers. They are installed only as necessary to control the vertical alignment of the plug.

- (2) Install the necessary shims (13, fig. 108) and secure the wedge group to the erecting beam assembly.

- (3) Install the preformed packing (4) and the tube nipple (3) underneath the wedge group.

- (3.1) Install the tee group (2) on the tube nipple. Connect the tube assembly (2.1) to the tee group. Torque the coupling nuts of the tube assembly and the tee group to 300 pound-inches.

- (3.2) Connect the tube assembly (1) at the rear of the wedge group. Torque the coupling nuts of the tube assembly to 300 pound-inches.

- (4) Remove the hexagon-head bolt (5) from the adjuster assembly (12) and install the flat-head screw (12A).
- (5) Close the EQUILIBRATOR SYSTEM BY-PASS valve (fig. 60) and the SYSTEM BY-PASS valve.
- (6) Bleed the air from lines as described in paragraph 89b (3) through (3.6).
- (7) Adjust unlock switch and lock switch (fig. 95) as described in TM 9-1440-250-20/1.
- (8) Install three access cover plates (view A, fig. 180) and front end cover.

#### 74. Rear Locking Wedge Group and Locking Wedge Adjuster Assembly

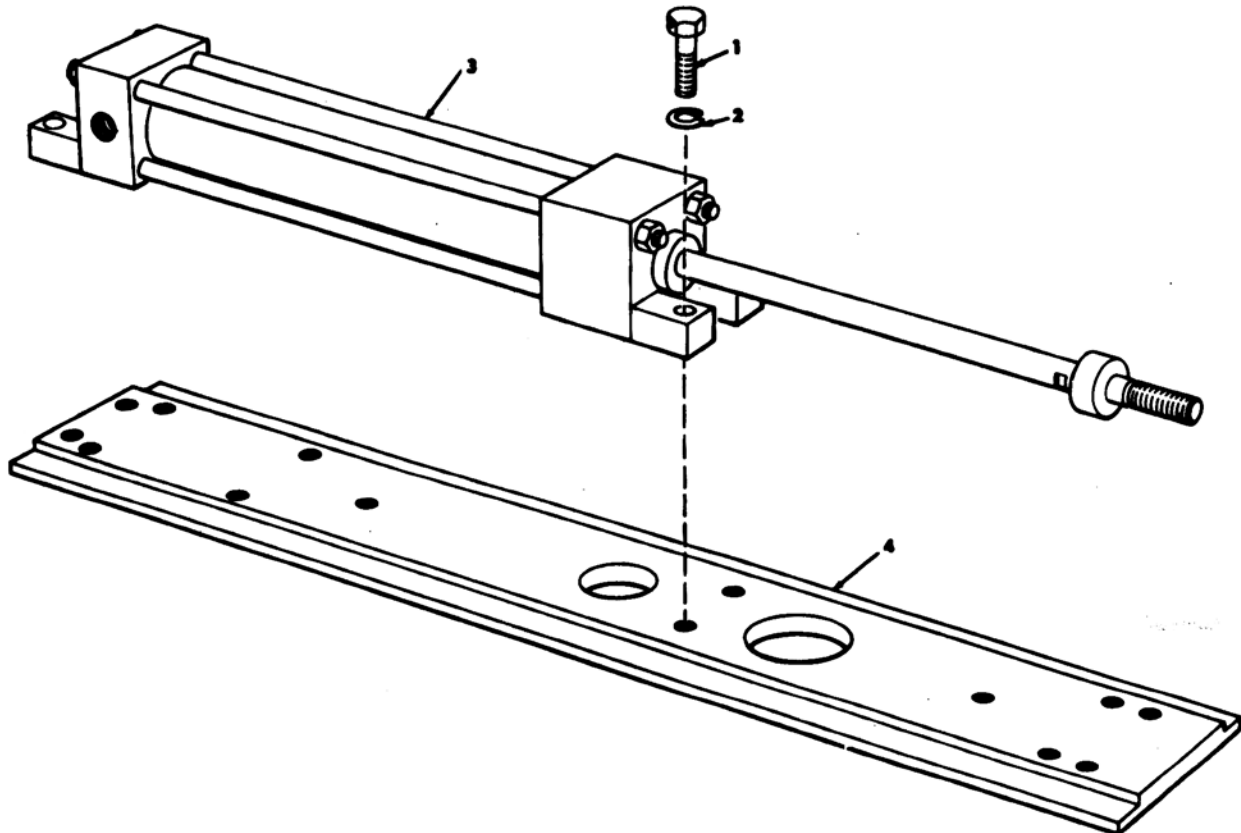
The rear locking wedge group and locking wedge adjuster assembly (fig. 114) are located

in the center section of the launcher erecting beam.

*Note.* The key numbers shown in parentheses shown in *a* through *d* below refer to figure 114 unless otherwise indicated.

##### *a. Removal.*

- (1) Remove beam center cover (fig. 82).
- (2) Open the EQUILIBRATOR SYSTEM BY-PASS valve (fig. 60) and the SYSTEM BY-PASS valve.
- (3) Depressurize the hydraulic oil reservoir by turning the handle of the plug cock to the VENT position and holding until all pressure is discharged.
- (4) Remove tube assembly (1) from rear locking wedge group and cap open line.

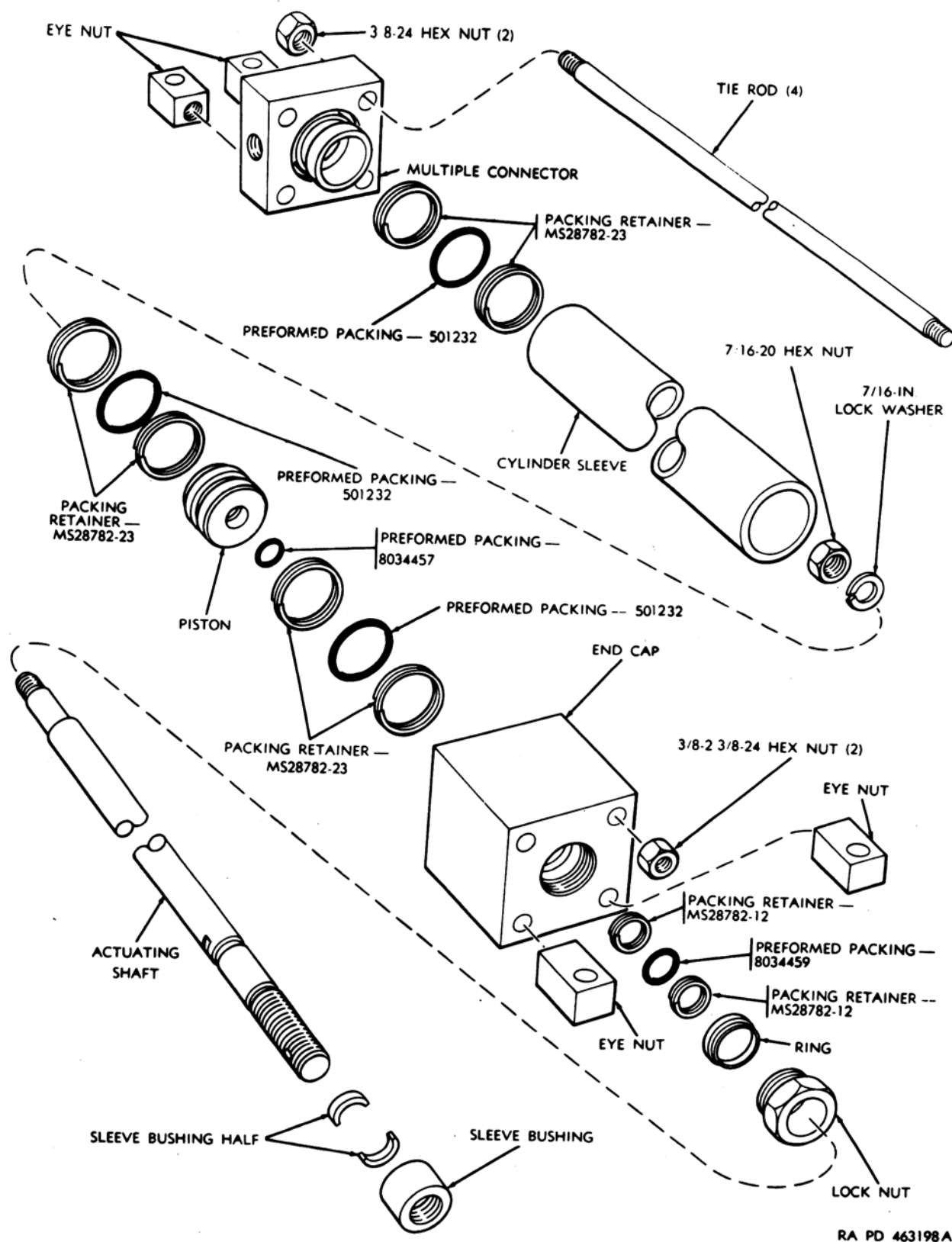


ORD G55648

- 1—3/8-24 x 1-13/64 hexagon-head bolt (1253 and subsequent)
- 2—3/8-inch lockwasher (4) (1021 through 1252)

- 3—Locking-wedge hydraulic cylinder assembly
- 4—Plate

*Figure 112. Disassembly and assembly of the locking wedge hydraulic cylinder group.*

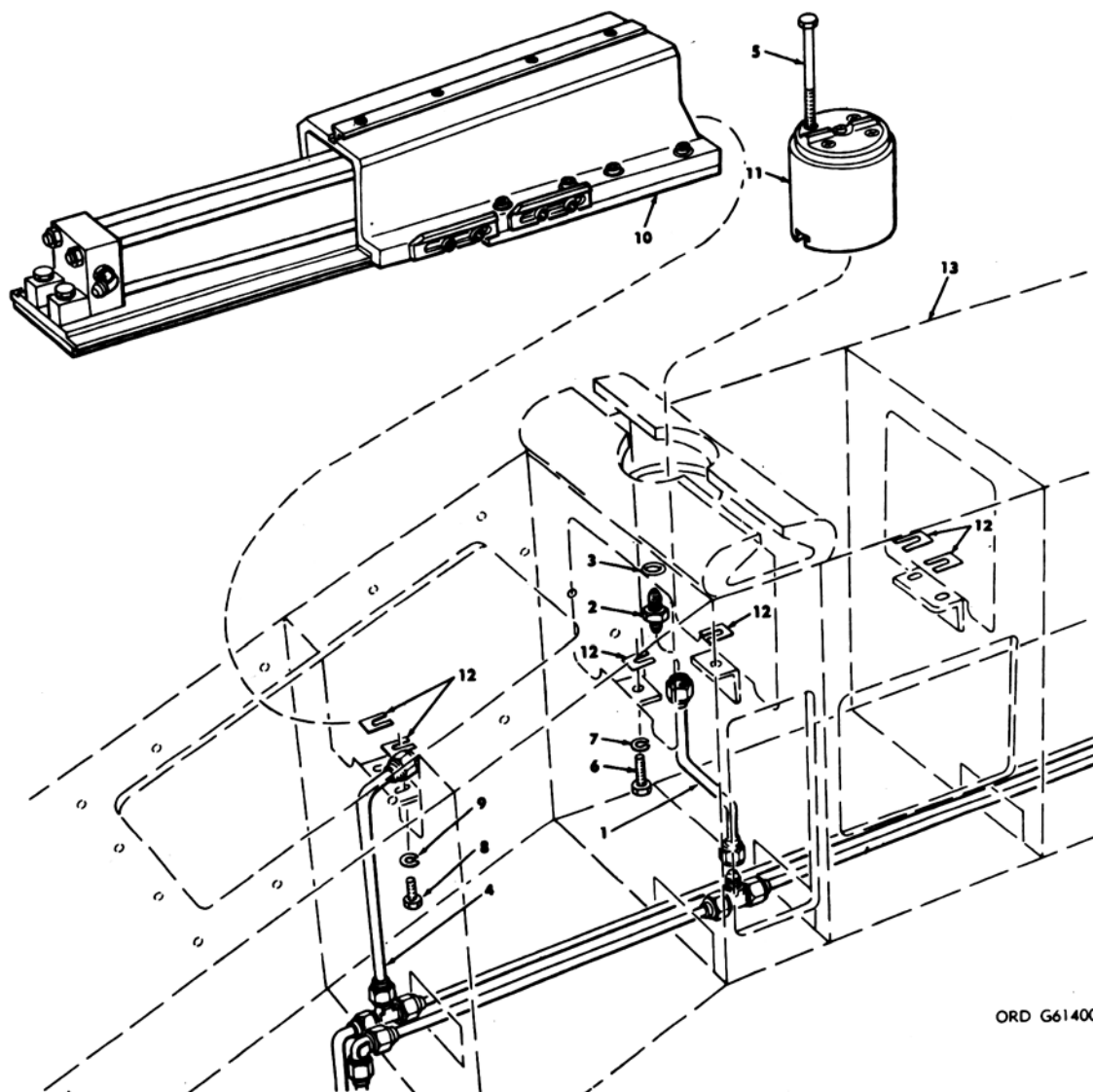


RA PD 463198A

Figure 113. Disassembly and assembly of the locking-wedge hydraulic cylinder assembly.

- (5) Remove tube nipple (2) and preformed packing (3). Discard preformed packing.
- (6) Disconnect tube assembly (4) at rear of locking wedge group (10) and cap open line.

- (7) Remove one of the four flat-head screws (12A, fig. 108) from the locking wedge adjuster assembly (11) and replace it with hexagon-head bolt (5). Use this long bolt as a handle to hold and prevent the locking wedge



ORD G61400

- |  |  |
|--|--|
| 1—Tube assembly 8167809  | 7—3/8-inch lockwasher (2)                    |
| 2—Tube nipple  | 8—3/8-inch x 1 1/4 hexagon-head capscrew (4) |
| 3—Preformed packing  | 9—3/8-inch lockwasher (4)                    |
| 4—Tube assembly 8167808  | 10—Rear locking wedge group                  |
| 5—1/4-20 hexagon-head bolt (used only during removal or installation of locking wedge adjuster assembly) | 11—Locking wedge adjuster assembly           |
| 6—3/8-24 x 11/16 hexagon-head capscrew (2)   | 12—Shim 8525201 (1253 and subsequent)        |
|  | 13—Launcher erecting beam                    |

Figure 114. Removal and installation of the rear locking-wedge group and locking-wedge adjuster assembly.





- adjuster assembly (11) from falling and becoming damaged when the locking wedge group (10) is removed.
- (8) Remove six hexagon-head cap screws (6 and 8) securing the locking wedge group (10) to the launcher erecting beam (13).
  - (9) Remove the locking wedge group (10) by moving it to the rear until it slides free of the wedge adjuster assembly (11).

*Note.* On launcher units 1253 and subsequent, shims (12) are installed beneath the locking wedge group (10). These shims are to be installed in their same position upon installation of the locking wedge group in *d* below.

- (9.1) Remove shims (12).
- (10) Remove locking wedge adjuster assembly (11) from erecting beam (13).
- b. Disassembly.* Disassemble rear locking wedge group (10) as described in paragraph 73b.

*c. Assembly.* Assemble rear locking wedge group (10) as described in paragraph 73c.

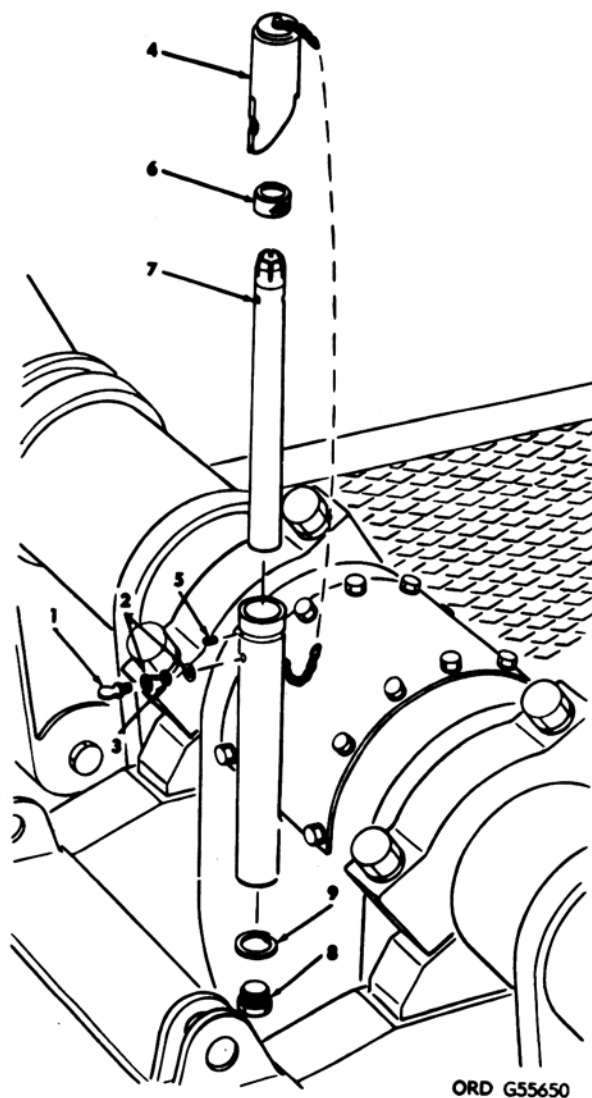
*d. Installation.*

- (1) Install hexagon-head bolt (5) in locking wedge adjuster assembly (11), and position adjuster assembly in launcher erecting beam (13).
- (1.1) Position rear locking wedge group (10) in erecting beam and align key slot in lower portion of adjuster assembly (11) with erecting beam locking key (3, fig. 111).

*Note.* On launcher units 1523 and subsequent, if installing wedge group (10) removed in *a* (9) above, install shims (12) in their original position. If installing a new wedge group, install shims, as required, to insure vertical positioning of the locking wedge adjuster assembly.

- (2) Install necessary shims (12) and secure locking wedge group (10) to erecting beam (13).
- (3) Install new preformed packing (3), tube nipple (2), and tube assembly (1) underneath rear locking wedge group (10). Connect tube assemblies (1 and 4) and torque coupling nuts to 300 pound-inches.

- (4) Remove hexagon-head bolt (5) from adjuster assembly (11), and install flat-head screws (12A, fig. 108).
- (5) Close EQUILIBRATOR SYSTEM BY-PASS valve (fig. 60) and SYSTEM BY-PASS valve.



- 1—Thumbscrew
- 2—1/4-id x 5/8-od flat washer
- 3—1/4-inch lockwasher
- 4—Cap assembly
- 5—1/4-20 x 1/2 setscrew
- 6—Mount collar
- 7—Aiming circle mount tube
- 8—Plug
- 9—1 1/8-inch lockwasher

Figure 114.1. Removal and installation of the aiming circle mount tube.

- (6) Bleed air from lines as prescribed in paragraph 89b (2) through (3.9).
- (7) Adjust switch assemblies (fig. 96) as described in TM 9-1440-250-20/1.
- (8) Install beam center cover (fig. 82).

#### 74.1 Aiming Circle Mount Tube

*Note.* The key numbers shown in parentheses in *a* and *b* below refer to figure 114.1.

##### *a. Removal.*

- (1) Loosen thumbscrew (1) and remove cap assembly (4).

- (2) Loosen setscrew (5).
- (3) Remove aiming circle mount tube (7).
- (4) Remove plug (8) and lockwasher (9).

##### *b. Installation.*

- (1) Install lockwasher (9), plug (8), and aiming circle mount tube (7).
- (2) Tighten setscrew (5).
- (3) Install cap assembly (4) and tighten thumbscrew (1).

### Section V. MAINTENANCE OF ERECTING STRUT FORK AND STRUT ARMS

#### 75. General

This section covers the field maintenance of the angle of elevation adjustment group, the sleeve bushings in the erecting strut assemblies, and the two launcher plate locks on the strut assemblies. The general precautions prescribed in paragraph 58 must be observed when any maintenance is performed.

#### 76. Angle of Elevation Adjustment Group

The angle of elevation adjustment group (fig. 116) is located where the erecting strut assemblies connect to the launcher erecting beam assembly.

##### *a. Removal.*

- (1) Place two automotive jacks (fig. 115), capable of lifting a minimum of three tons, under the launcher strut. Raise the jacks until they are equally snug under the struts.
- (2) Remove the cup-point hexagon-socket setscrew (fig. 116) from each adjusting beam strut bearing on both sides of the beam assembly.
- (3) Remove the three cotter pins, castellated hexagon nuts, flat washers, and

hexagon-head bolts from the strut assembly.

- (4) Remove the snap retainer and thrust washer from each end of the headless grooved shaft.
- (5) Slide grooved shaft into beam assembly far enough to disconnect strut assembly.

*Note.* Sliding the shaft only part way through the beam assembly permits the shaft to hold the strut assembly on the opposite side of the beam assembly and to prevent the arms from dropping.

- (6) Remove bearing thrust washer and retract extended part of strut assembly.
- (7) Remove lubrication fitting.
- (8) Remove six internal-wrenching bolts and remove strut bearing.

##### *b. Installation.*

- (1) Refer to TM 9-1440-250-20/1 for angle of elevation requirements; position and install adjusting beam strut bearing on launcher erecting beam assembly at specified angle of elevation.

- (2) Lockwire the six  $\frac{1}{4}$ -16 x  $2\frac{1}{2}$  internal-wrenching bolts with 0.051-inch steel lockwire.
- (3) Install remaining parts of adjustment group.
- (4) Torque three  $\frac{1}{4}$ -16 castellated hexagon nuts to 300 pound-inches and install three  $\frac{3}{8}$  x 2 cotter pins.
- (5) Remove automotive jacks (fig. 115) from under launcher strut.

## 77. Sleeve Bushings

One sleeve bushing (fig. 117) is located in each of the two strut arm assemblies where they connect to the launcher strut.

### a. Removal.

- (1) Remove the hydraulic up-lock assembly (D, fig. 216) as described in paragraph 102a.
- (2) Remove crossmember arm (fig. 117).

*Note.* The strut arm assemblies (fig. 117) and the crossmember arm, and the strut arm assemblies and crossmember arm (D, E, and F, fig. 118) have either a two-hole or a four-hole pattern on launcher units 1253 through 1891. Since these parts have the same respective part numbers, the two-hole or four-hole configuration should be specified when ordering any of these three parts within this effectivity.

- (3) Remove erecting strut fork or strut arm assembly (fig. 117).

### b. Disassembly.

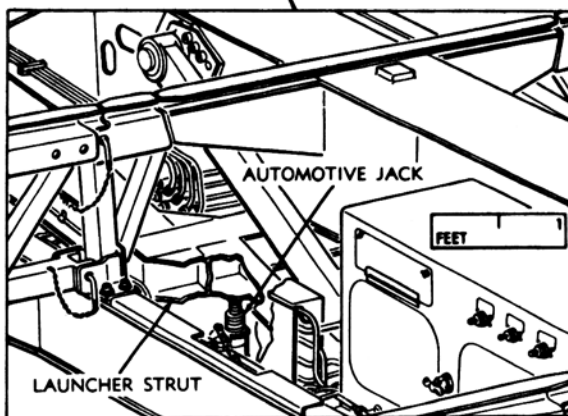
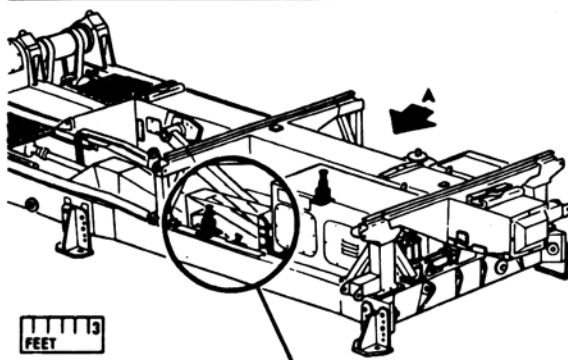
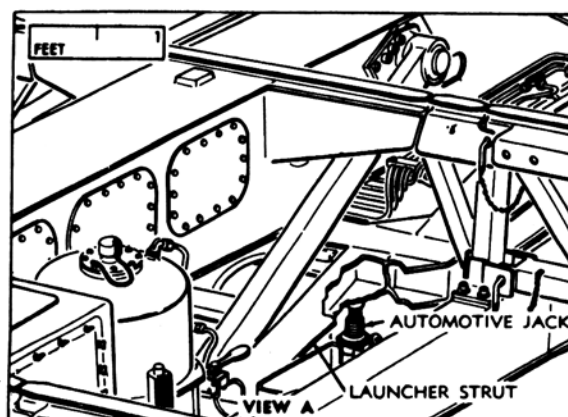
- (1) Remove the lubrication fittings (fig. 117; and A1, D1, and E1, fig. 118), as required.
- (2) Remove the sleeve bushing (fig. 117; and A2, D2, and E2, fig. 118), as required.

### c. Assembly.

- (1) Press fit and stake sleeve bushing in strut arm assembly (fig. 117; and D and E, fig. 118) or erecting strut fork (A, fig. 118).
- (2) Install lubrication fittings (fig. 117; and A2, D2, and E2, fig. 118).

### d. Installation.

- (1) Refer to TM 9-1440-250-20/1 for angle

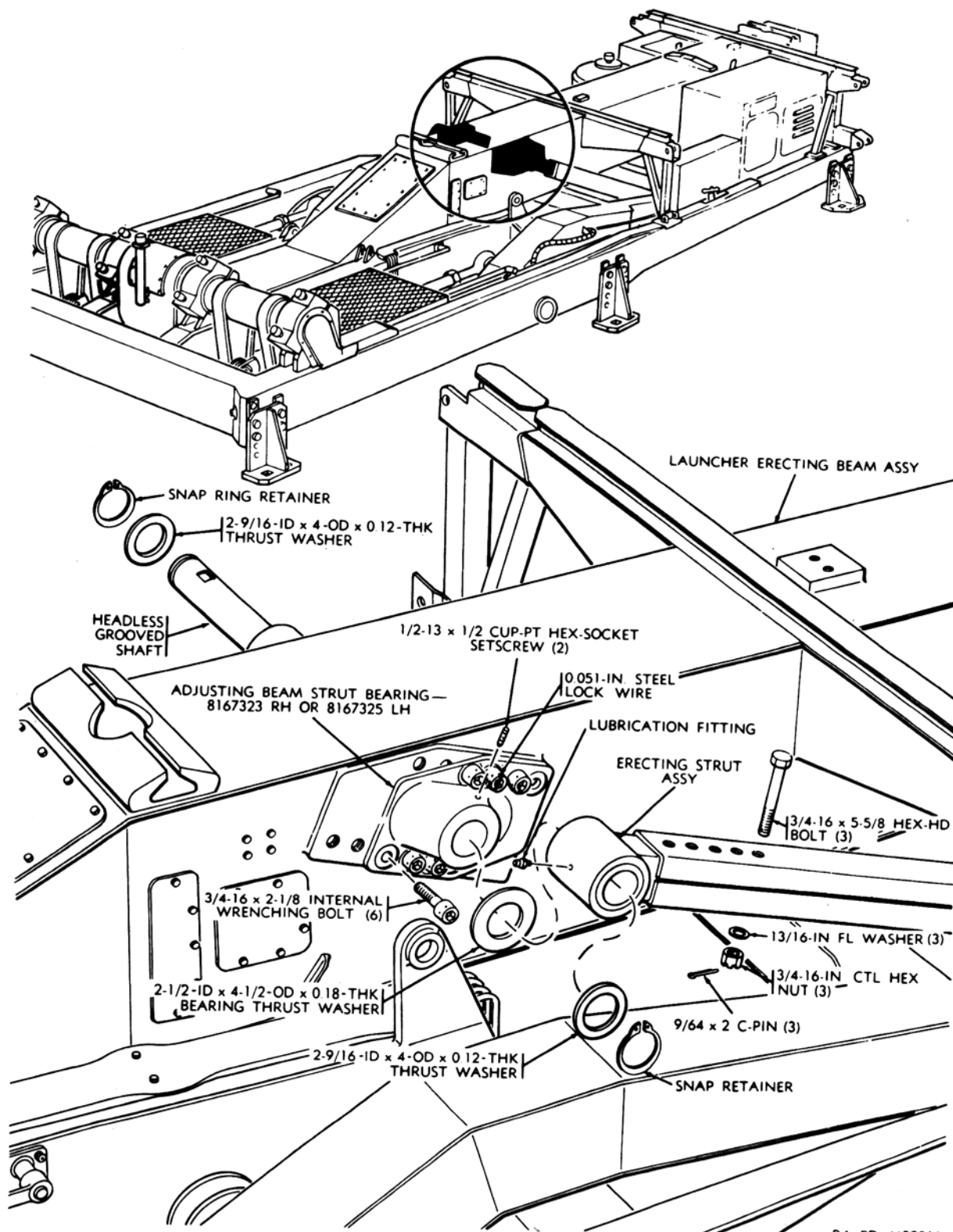


RA PD 464188

Figure 115. Launcher struts — automotive jacks in position.

of elevation requirements and position and install strut fork (fig. 117) or strut arm assembly at specified angle of elevation.

- (2) Torque three  $\frac{1}{4}$ -16 castellated hexagon nuts to 300 pound-inches and install three  $\frac{3}{8}$  x 2 cotter pins.
- (3) Install crossmember arm.



RA PD 463981A

Figure 116. Angle of elevation adjustment group—removal and installation—typical.

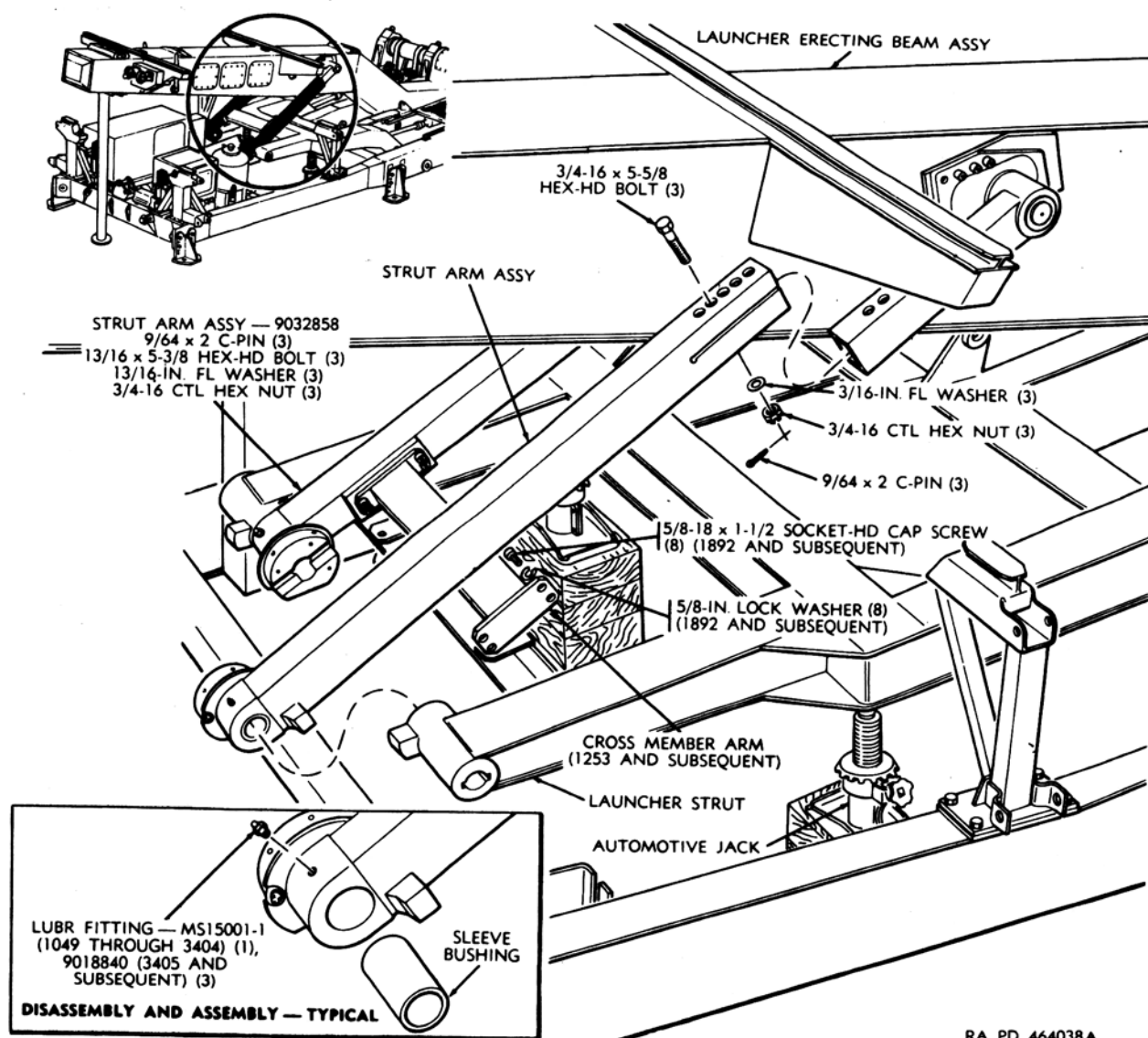


Figure 117. Strut arm assembly—removal and installation.

- (4) Install the hydraulic up-lock assembly (D, fig. 216) as described in paragraph 102e.

## 78. Launcher Plate-Lock (1021 through 1252)

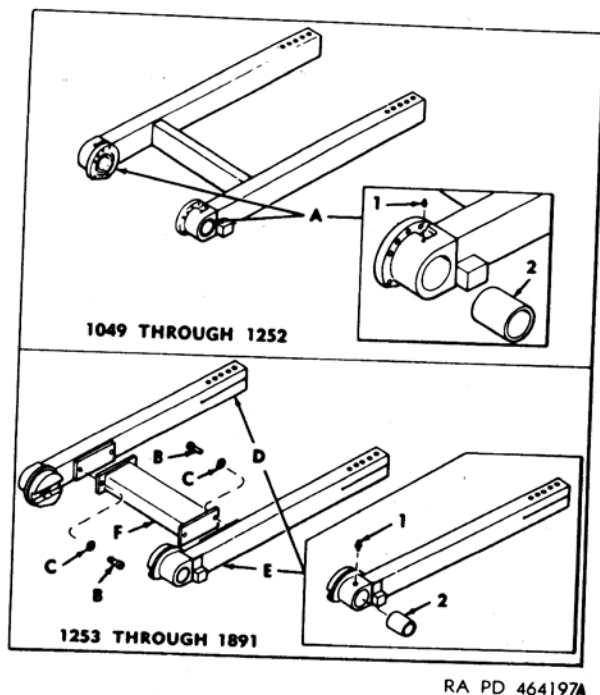
A launcher plate-lock (fig. 119) is bolted to each arm of the erecting strut fork (fig. 117) on launcher units 1021 through 1252. On launcher units 1253 and subsequent, the erecting strut assemblies are redesigned to incorporate the function of the launcher plate-locks (fig. 119).

### a. Removal.

- (1) Remove the hydraulic up-lock assembly (D, fig. 216) as described in paragraph 102a.
- (2) Remove launcher plate-lock (fig. 119).

### b. Installation.

- (1) Position and install plate-lock.
- (2) Lockwire 1/2-20 castellated hexagon nuts with 0.051-inch lockwire.
- (3) Install hydraulic up-lock assembly (D, fig. 216) as described in paragraph 102e.



RA PD 464197A

- A—Erecting-strut fork
- 1—Lubrication fitting
- 2—Sleeve bushing
- B—5/8 — 18 x 1 1/2 socket-hd capscrew (4)
- C—5/8-inch lockwasher
- D—Strut arm assy 9032858
- 1—Lubrication fitting
- 2—Sleeve bushing
- E—Strut arm assy 9032849
- 1—Lubrication fitting
- 2—Sleeve bushing
- F—Cross-member arm

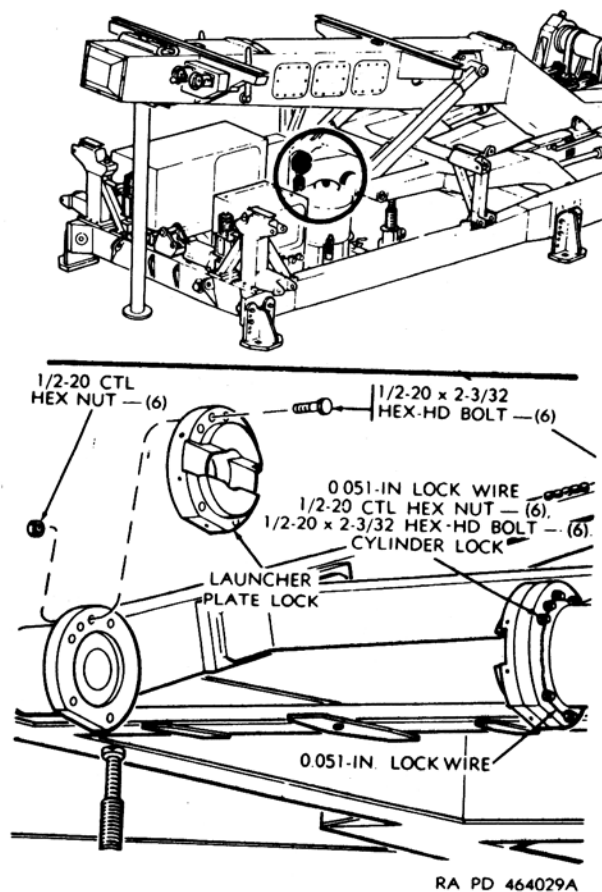
Figure 118. Strut arm assembly—disassembly and assembly.

## Section VI. MAINTENANCE OF LAUNCHER HYDRAULIC SYSTEM

### 79. General

This section describes the maintenance of the hydraulic pumping unit assembly, the hydraulic panel, the hydraulic oil reservoir assembly, and the equilibrator accumulator. Coverage is also provided for the tube and pipe assembly and fitting networks for the hydraulic pre-charge system, axial pistons pump system, locking wedge hydraulic system, down-lock hydraulic system, erecting hydraulic system, equilibrator hydraulic system, up-lock hydraulic system, and the missile hydraulic system. The general precautions prescribed in paragraph 58 must be observed whenever any hydraulic system maintenance is performed.

C17



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Figure 119. Launcher plate-lock (1021 through 1252)—removal and installation.

### 80. Hydraulic Pumping Unit

The hydraulic pumping unit (fig. 3) is located on the right side of the launcher base. Major components of the pumping unit are shown on figures 120 and 121. Maintenance of the pumping unit consists of replacement of the hydraulic pumping unit assembly (C, fig. 122) and maintenance of individual components of the pumping unit assembly.

*Note.* The key letters shown in parentheses in a below refer to figure 122.

#### a. Hydraulic Pumping Unit Assembly.

*Note.* The extent of maintenance required on the hydraulic pumping unit assembly (C) determines whether it is necessary to remove it from the launcher base assembly (H).